Deanship of Graduate Studies

Al-Quds University

Factors Affecting Glaucoma Patients' Compliance to Topical Anti-glaucoma Medications at SJEHG

(Jerusalem, Hebron and Anabta)

Khitam Ibrahim Hussein Al-Hasanat

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Prepared by:

Khitam Ibrahim Hussein Al-Hasanat

B.S. Stuff Nurse–form Bethlehem University/ Palestine

Supervisor: Dr. Mohammad Shaheen

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Thesis Approval

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Prepared by: Khitam Ibrahim Hussein Al-Hasanat

Registration No: 21511655

Supervisor: Dr. Mohammad Shaheen

Master thesis submitted and accepted, Date : 3 / 5 /2017 , The names and signatures of the examining committee members are as follows:

1- Head of Committee: Dr. Mohammad Shaheen Signature:
2- Internal Examiner : Dr. Dr. Asma Imam Signature:
3- External Examiner: Dr. Ahmad Ma'ali Signature:

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Dedication

In thankfulness and greeting, this thesis is dedicated to my beloved husband Isam, sons Aysar & Ihab, and to my family mother, father, brothers, and sisters.

To my friends and colleagues and to everyone who supported me in accomplishing this work.

To every glaucoma patient who suffered from this disease and may suffer from lose vision due to this disease, hoping that this research would give them hope in life.

Khitam Ibrahim Al-Hasanat

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that the thesis (or any part theory) has not been submitted for a higher degree to any other university or institution.

Singed:……..

Khitam Ibrahim Hussein Al-Hasanat

Date: 3/ 5 /2017

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My thanks to those colleagues, who are interested in my thesis, and decided to help in collecting data.

Gratitude also goes to the thesis external examiner.

I would like to thank those participants, who kindly agreed to participate in this study.

Abstract:

Back ground: Glaucoma is the second leading cause for blindness worldwide (Quigley ,et al, 2006). A significant contributing factor to this problem is low compliance with anti-glaucoma treatment. Ocular hypotensive medications are used by 86% of patients with glaucoma and are the most common treatment for glaucoma. (Friedman, et al, 2005) Although the correct diagnosis and appropriate treatment is a critical component in the management of this disease, compliance is equally importance. Patients with glaucoma most often require lifelong treatment and follow-up care to preserve vision. Compliance is reported worldwide to vary from as low as 5% to as high as 80%. (Olthoff, et al,2005) However, limited information is available on this issue in Middle East. In Palestine, there have been no study in this regard, to date.

Aim: The aim of this study was to assess the level of compliance, and the factors affecting compliance to topical anti-glaucoma medication, among Palestinians with glaucoma, who attend SJEHG at (Jerusalem, Hebron, and Anabta).

Method: This study used a quantitative, descriptive, cross-sectional survey design within SJEHG, on 320 glaucoma patients. The psychometrics of the Glaucoma Treatment Compliance Assessment Tool (GTCAT), was used to assess adherence with glaucoma therapy. This questionnaire included items related to the six 'Health Belief Model' constructs, as well as other relevant information, such as age, medical history, gender, income, education levels, and type of insurance coverage. Most questions included a 5-interval Likert scale response with anchoring definitions (eg, 1=absolutely disagree, 5=absolutely agree).

The questionnaire was filled out during face-to-face interviews between trained neutral interviewers and the patients. Frequencies and descriptive analysis, ANOVA test, chi-square test, regression test were applied.

Results: The overall noncompliance level was 71.6%. Noncompliance was found to be higher in males than females (74%) to (69%) respectively. Noncompliance level was higher in those above fifty years. Divorced glaucoma patients had the highest noncompliance level (94%). Retired and unemployed had a noncompliance level (81%) and (79%) respectively. Noncompliance level was high in glaucoma patients who were considered blind.

Compliance was found to be related to the level of education, with the highest noncompliance level was in illiterate (76%). Participants generally had a moderate level of knowledge about their disease, which together with self efficacy affected compliance positively.

Treatment barriers affected compliance negatively. The factors that had the most impact on compliance were, primarily: was the availability of glaucoma drops with patients at the prescribed the time, secondly: the side effect of glaucoma drops, thirdly: forgetfulness.

Despite the majority of Glaucoma patients having insurance they were noncompliant, because their insurance didn't cover the cost of follow up and treatment.

Key Words:
Glaucoma, Compliance, Adherence, Glaucoma Medications (Topical anti-glaucoma medication)

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Term	
SJEHG	St. John Eye Hospital Group
MOH	Ministry of Health
HBM	Health Belief Model
VA	Visual Acuity
SPSS	Statistical Package for Social Sciences
ANOVA	Analysis of variance
POAG	Primary Open Angle Glaucoma
OAG	Open Angle Glaucoma
ACG	Angle Closure Glaucoma
VF	Visual Field
CCT	Central Corneal Thickness
OCT	Optical Coherence Tomography
IOP	Intraocular pressure
GTCAT	Glaucoma Treatment and Compliance Assessment Tool
UNRWA	United Nations Relief and Work Agency insurance
NTG	Normal-Tension Glaucoma
ICE	Irido Corneal Endothelial Syndrome

Chapter One

Introduction:

This chapter aims to provide the context and structural outline of the thesis. An overall rationale for study, is provided together with an overview of the setting of the study. In addition, this chapter introduces the theoretical and ethical basis of the study. It includes research problem, research justifications, aim and objectives of the research, research questions, study limitations, definitions of the key concepts, and description of study setting .

Glaucoma is a preventable cause of blindness, if timely effective and successful treatment is provided. Patient adherence to the medication is a constant challenge that is now recognized as an essential component to treatment and one of the most important factors in controlling high intra ocular pressure (IOP), preventing and reducing chance of vision loss and blindness. (Robin et al., 2004)

This quantitative, descriptive, study focuses on identifying and explaining factors associated with compliance to topical anti-glaucoma treatment among diagnosed glaucoma patients attending St. John Eye Hospital Group (SJEHG) in three cities. The main hospital located in middle of Palestine, Hebron branch which covers the southern area and Anabta branch which covers northern area.

1.1: Background

Glaucoma is the second leading cause for blindness worldwide (Quigley, et al, 2006). Glaucoma with both its entities, open angle glaucoma (OAG) and angle closure glaucoma (ACG), affected about 60.5 million people worldwide, of whom 4.5 million are estimated to become legally blind 2010, this number was estimated to increase to 79.6 million by 2020 (Quigley et al., 2006).

According to Quigley et al., (2006) the prevalence of primary open angle glaucoma (POAG) is estimated to be between 1.1% and 3% in Western populations over the age of 40 years

The estimated number of POAG patients in Israel is 60,000 (Masoud et al., 2013). Ocular hypotensive medications are used by 86% of patients with glaucoma and are the most common treatment for glaucoma (Friedman et al., 2005). According to Kass et al., (2002) medications are very effective in reducing the development or worsening of glaucoma by at least 60%, compliance to topical anti-glaucoma medication has always been a major problem.

In Israel glaucoma was documented to be the third cause of blindness, accounting for nearly one-eighth of the cases (Avisar et al., 2006).

Few regional studies have defined glaucoma as the leading cause of blindness at a prevalence rate of 2–9% in Egypt, 1.73% in Qatar, and 4.75% in Oman (Abu Hussein et al., 2015), in Palestine no study related this topic. Glaucoma had also been found to contribute to legal blindness at a rate of 8% in a study done at Cairo University 2014, 12.1% at Mansoura University 2002.

Despite significant progress in the diagnosis and treatment of glaucoma, a high percentage of patients still losing their sight. One pertinent contributing factor to this problem is low compliance with anti-glaucoma treatment (Lee et al., 2000).

In the literature, compliance is reported to vary from as low as 5% to as high as 80% (Olthoff et al., 2005). However, limited information is available on this issue in the Middle East. In Palestine, there have been no study in this regard, to date.

The management of primary glaucoma is surrounded by an appreciable number of problems that do not arise in the treatment of any other disorder in ophthalmology. Firstly, because of the painless and gradual nature of the visual deterioration, late presentation to the hospital is common (Parikh et al., 2008).

Adherence with glaucoma medications is a key component of a successful glaucoma treatment program. Everett, the former US Surgeon General, famously remarked, “Drugs don’t work in patients who don’t take them” (Everett, 2009, pp:184).

Adherence to ocular hypotensive medications is a critical part of secondary prevention of visual impairment from glaucoma. Ocular hypotensive medications are used by 86% of patients with glaucoma and are the most common treatment for glaucoma (Friedman et al., 2005).

Glaucoma patients require long-term treatment over an average of 15 years (Broman, et al, 2008). Finally, medications are very effective in reducing the development or worsening of glaucoma by at least 60% (Kass et al., 2002).

1.2: Organizations that provide ophthalmic screening and follow up for glaucoma patients:

SJEHG in its four location: Jerusalem, Hebron, Anabta, and Gaza. The Ministry of Health (MOH) eye clinics in the governmental hospitals: Hebron, Ramallah, Nablus, and Bethlehem, these provide basic medical management and treatment of glaucoma, SJEHG has the only glaucoma specialist in Palestine, who is able to provide a comprehensive glaucoma service in Jerusalem, with monthly visits to Hebron and Anabta.

In Palestine we have around nine private ophthalmic centers, beside several private ophthalmic clinics, which offer follow up for stable glaucoma patients. Palestine has 105 registered ophthalmic doctors, the ratio of ophthalmic doctor to population is around 1:50000 which considered good, compared to our neighboring countries like Jordan (Palestinian Ophthalmic Society, 2017).

It's important to note that there are three main tracks of health insurance in the Occupied Palestinian Territories: government insurance, which encompasses (65%) of the residents and is affordable but with partial coverage of health needs, the United Nations Relief and Work Agency insurance, which is only for the refugee population (37%), and private insurance, which covers just (2%), and the remaining (18%) of the population is uninsured (MOH, 2012).

1.2.1: General barriers toward compliance with topical anti-glaucoma treatment and screening:

In general, barriers and factors affecting glaucoma patients' compliance to topical treatments in SJEHG could include socioeconomic issues, such as the cost involved in seeking follow up services in addition to high cost of medication, which affect their compliance level with anti-glaucoma treatment based on instability of economic and political situation in our country due to occupation and unexpected future events (political instability and conflict related occupation).

Due to the influence of various, social, and economical factors on topical treatments, glaucoma patients are averse to comply with treatments at the early stages when treatment is most expected to be successful to save vision (Kass et al., 2002).
Knowledge and awareness about the risks of glaucoma and the benefits of topical treatments may constitute barriers to the access and utilization of glaucoma topical treatments based on literature review (Robin et al., 2004).

The factors can be classified into four groups, to facilitate explanation and understanding. These groups are patients related factors, glaucoma related factors, treatment related factors, and health care provider related factors (Striker et al., 2010).
I believe it is very important to understand factors that affect compliance, and the findings of my study will be useful in order to develop interventions and program to address specific remaining barriers to improve compliance among Palestinian glaucoma patients.

Having one glaucoma specialist results in patients having to wait long to see a glaucoma specialist. It also restricts patients choice and may create a barrier to optimal patient physician relationships, which could affect their compliance level.
The non-availability of glaucoma specialist to follow up glaucoma patient and to order relevant tests like visual field (VF), and central corneal thickness (CCT), Optical Coherence Tomography (OCT) of the optic nerve, and the lack of these machines in most clinics and centers outside SJEHG were considered barriers for glaucoma patients.

These barriers leave glaucoma patients with just one choice, to visit SJEHG. This entails traveling long distances, the cost of transportation and time spent combined with medication costs may prevent glaucoma patients from accessing this service, resulting

in noncompliance to regular follow up and treatment, notwithstanding the difficulties they face when passing through check points of Israel occupation. All these factors may also lead to a disparity in compliance, between patients living in the main city and those in the rural areas.

1.3: Study Problem

Patients are more likely to be adherent to their medication if they understand the disease and the rationale for treatment and if their treatment regimen is simplified (Nordstrom et al., 2005). Additionally, using eye drops has its own set of challenges that must be recognized and addressed at the clinical level. The numerous socioeconomic factors associated with poor adherence, must be addressed, at a national level. Maximizing patient adherence to medication has the potential to prevent unnecessary vision loss, reduce the number of surgical interventions required to control glaucoma, and save the overall healthcare system money in the long run. Results of a study published in the January 2014 issue of Ophthalmology shows that the risk of blindness related to glaucoma 20 years after diagnosis has decreased by 50% due to early intervention and consistent treatment (Malihi et al., 2014).

In Palestine there is still a gap in consistent treatment resulting in our glaucoma patients facing blindness. The prevalence of bilateral blindness in Palestine (Visual Acuity (VA) <3/60 in the better eye with available correction) was 3.4% as reported by Chiang, et al (2010) study, which can be prevented or significantly reduced by working on the factors affecting compliance with topical by working on factors affecting compliance with topical anti-glaucoma treatment. Including government, and service providing organizations. Adherence to ophthalmic medications has a unique set of challenges compared to oral medications. Screening for raise Intraocular Pressure (IOP) is effective in helping the physicians in early detection and treatment of glaucoma.

Compliance to topical anti-glaucoma treatments can also reduce the total expenditure to cover treatment and medications cost for glaucoma patients, in long run term. Ophthalmologists may mistake noncompliance for ineffectiveness of a given anti-glaucoma medication and prescribe more medications or shift to surgery, aggravating the problem with additional costs and risks (Buskirk, 1996).

In this study I researched the factors representing as a barriers that make glaucoma patients noncompliance with glaucoma topical treatment, including personal related factors, treatment related factors, glaucoma related factors, and health provider related factors.

The results of this research gave us indicators as to whether they directly affected some personally, socially, or economically and health system strategy on improving compliance to topical anti-glaucoma treatments in SJEHG.

1.4: Study justification:

Patients with glaucoma most often require lifelong treatment and follow-up care, to preserve vision. The current standards for glaucoma treatment range from topical medications and laser procedures, to incisional surgery. Glaucoma is a preventable cause of blindness, however, numerous studies, in both developed and less developed countries, have demonstrated that access to eye care resources and adherence to treatment are still the major obstacles (Robin et al., 2004).

Once the diagnosis of glaucoma has been established, effective treatment is paramount. Treatment involves both rationale therapeutic interventions and patient adherence to the intervention. The therapeutic benefit from medication is maximized when administered correctly.

There is no national program for glaucoma in Palestine, Some attempts to counteract this have been undertaken by SJEHG and its outreach clinic, by providing screening, diagnostic and therapeutic services for patients with, or at risk of, developing glaucoma. Besides, patient and family health education on the risks of this disease. SJEHG also continually seek funds to help provide patients with their glaucoma medication, free or at a greatly subsidized fee. From the results of this study, I hope to highlight the barriers to compliancy and help strategize a plan at a local and even national level to combat these, improving the patient's quality of life and reducing the negative socioeconomic impact, to the patient, their family and eventually nationally.

Through my research into literature on this topic, I observed there were no publications on compliance among Palestinians on medically treated glaucoma.

My research centered on identifying the factors that affect compliance with topical anti-glaucoma treatments in patients attending SJEHG. It is very important to determine what causes glaucoma patients' noncompliance, and the results of the research will be put on the agenda of the strategic solutions to improve the health status of glaucoma patients attending the SJEHG.

The resulting data will also be used to educate and encourage patients to be compliant, reducing barriers when possible. This will eventually lead to reducing the incidence of unnecessary visual loss, and the need for surgical intervention. In the long term, leading to efficient utilization of resources and improved quality of life for these patients. Adherence to ophthalmic medications has a unique set of challenge

1.5: Research Objectives:

1.5.1: Aim & Objectives of the study

This study aims to assess the factors affecting compliance to topical anti-glaucoma treatments among Palestinian glaucoma patients who attend SJEHG at (Jerusalem, Hebron, and Anabta).

1.5.2: General Objectives

- To assess the compliance level of glaucoma patients who attend SJEHG clinic at (Jerusalem, Hebron, and Anabta) to their topical anti-glaucoma treatment.
- To examine the relation between:
  - Personal characteristics of the glaucoma patients on compliance level
  - Socioeconomic status on their compliance level
  - Health care providers related factors on patient's compliance level to topical anti-glaucoma treatments.

- To highlight the barriers, if any, so that recommendations can be incorporated into the strategic plans of interested organizations (ophthalmic hospital and clinic), and policy makers to overcome these barriers, where possible, for this specific population group (glaucoma patients), enhancing their level of compliance.

1.5.3: Specific Objectives

1. To identify the effect of age & gender characteristics on compliance to medication.
2. To determine the effect of patient's formal education level on compliance to anti-glaucoma medication.
3. To examine the relation between how much basic knowledge the patient has related to their disease and compliance to anti-glaucoma medication.
4. To examine the effect of number of eye drops used, and frequency of drops use on compliance to anti-glaucoma medication.
5. To identify the effect of having medical insurance on the patient's compliance to anti-glaucoma medications.
6. To identify the effect of dropper difficulties, physical inability, and side effects of medication on compliance to anti-glaucoma medications.

1.5.4: Research Questions:

1-What are the factors affecting glaucoma patient's compliance?
2-What is the most important factor affecting glaucoma patient's compliance?
3-What is the effect of the ophthalmic physician and nurses (health provider) related to glaucoma patient compliance?

1.6: Study Hypotheses:

The study question was built on the following hypotheses:

- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of knowledge level and demographic variables (age, address, marital status, educational level, occupation, income, health insurance).
- There is significant correlation at level of significant $\alpha \leq 0.05$ in the degree of compliance with the dropper difficulties, physical inability, and side effects of medication.
- There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of compliance to anti-glaucoma medication with respect to medication numbers and frequency of drops.

- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to having medical insurance.
- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to age and gender.
- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to address.
- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to marital status.
- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to educational level.
- There is a significant difference at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their vision.

1.7: Ethical approval and confidentiality consideration:

This study was approved by the SJEHG ethical committee and a written official letter of approval was granted (Annex A). Participation was voluntary; the participants were informed about the purpose of the study and its significance. The participants were assured that their responses would be confidential, completely anonymous, and only used for the purposes of scientific research.

Emphasizing, autonomy, data confidentiality and the right of glaucoma patients to refuse to participate in the study or withdraw any time, while still being entitled to the best care that SJEHG can provide, at every interview.

1.8: Study Limitations:

- The study was limited to glaucoma patients attending SJEHG clinic in Jerusalem, Hebron, and Anabta. Therefore, this study can't be generalized to all Palestinian glaucoma patients.
- Lack of research material on Palestinian glaucoma patient (no database).
- The study population is not specified, due to lack of registration in MOH reports.
- Some of the patients who didn't attend the clinic regularly may not be included in the study, despite the fact that these patients are very important to the study, because they are not compliant with their treatment.
- The sample is not representative of all the population, because it has been done only on glaucoma patients at SJEHG.

Chapter Two

Literature review:

2.1: Introduction:

This chapter aims to examine the literature related to compliance of glaucoma patients to topical anti-glaucoma treatment, In addition, a review of the research-based literature pertaining to the barriers affecting the compliance of the glaucoma patient and to determine the level of awareness and perspective of Palestinian glaucoma patients' responses to lifelong anti-glaucoma treatment. Researcher focuses on the definition of glaucoma, types, causes, and treatment of glaucoma.

This literature review aims to look into the factors influencing compliance, and facilitates the search process, based on previous studies. These factors will be studied under the following four parameters: personal related factors, treatment related factors, health provider related factors, and glaucoma related factors

2.1.1: Literature Search Strategy:

The literature search strategy focused on the purpose of the research, that is; to explore the personal related factors and the effect of the socio-economic situation, and demographic factors on compliance to topical anti-glaucoma treatments.

There are different kinds of resources including: books, journal articles, policies, directives and web sources. Overall, I found 90 sources, around 60 of which were used according to the key words criteria and also because they fitted the main objective of the study. The other sources were excluded because their goals were irrelevant or unsuitable.

All these types of resources are important in the research process, but they differ in many ways. It is also crucial to verify the accuracy and reliability of any data sources, the key search terms were: “factors affecting glaucoma patient compliance”.

All Studies that have been read, including Arabic and international, related to the study, were well-read and the results understood and linked to the aim of the study. All studies were arranged by year of publication.

2.2: Definition of glaucoma:

2.2.1: What is Glaucoma:

Glaucoma is a complicated eye diseases which results in damage to the optic nerve to progressive irreversible vision loss. A major risk factor is increased pressure in the eye (Casson et al., 2012).

Glaucoma is a group of clinical disorders that are characterized by optic nerve damage and visual field defects. The intraocular pressure levels may exceed the tolerance of the affected eye. The level of intraocular pressure that causes organic change is not definable since it varies widely from one eye to the other and some eyes may tolerate for long periods a pressure that would rapidly blind another (Blondeau et al., 2007).

Glaucoma can permanently damage vision in the affected eye, first by decreasing peripheral vision (reducing the visual field), and then potentially leading to blindness if left untreated. For eye pressures a value of greater than 21 mmHg is often used with higher pressures leading to a greater risk. However, some may have high eye pressure for years and never develop damage. Conversely, optic nerve damage may occur with normal pressure, known as normal-tension glaucoma (Rhee, and Douglas, 2013).

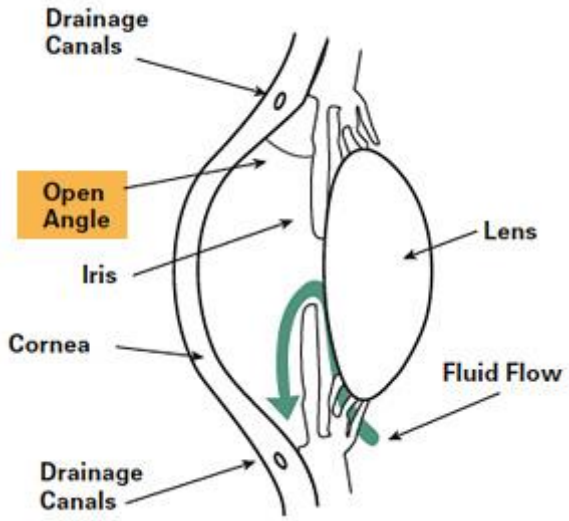
2.2.2: Types of Glaucoma:

There are several types of glaucoma. The two main types are open-angle (OAG) and angle-closure (ACG). These are marked by an increase of intraocular pressure (IOP), or pressure inside the eye.

Open-Angle Glaucoma (OAG):

Open-angle glaucoma, the most common form of glaucoma, accounting for at least 90% of all glaucoma cases:

- Is caused by the slow clogging of the drainage canals, resulting in increased eye pressure.
- Has a wide and open angle between the iris and cornea.
- Develops slowly and is a lifelong condition.
- Has symptoms and damage that are not noticed.



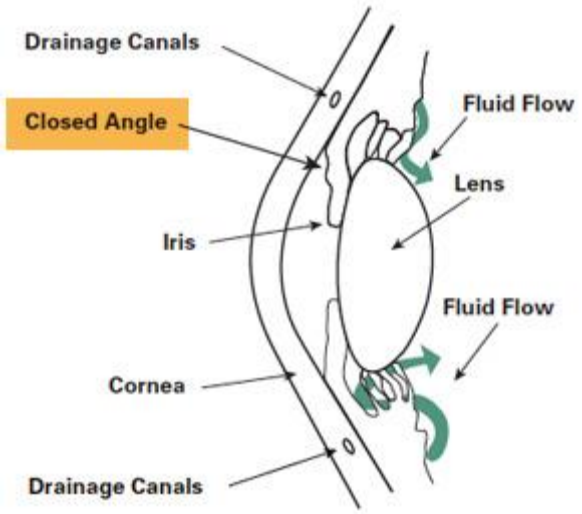
"Open-angle" means that the angle where the iris meets the cornea is as wide and open as it should be. Open-angle glaucoma is also called primary or chronic glaucoma. It is the most common type of glaucoma, affecting about three million Americans.

Angle-Closure Glaucoma (ACG):

Angle-closure glaucoma, a less common form of glaucoma:

- Is caused by blocked drainage canals, resulting in a sudden rise in intraocular pressure.
- Has a closed or narrow angle between the iris and cornea.

- Develops very quickly.
- Has symptoms and damage that are usually very noticeable.
- Demands immediate medical attention.



It is also called acute glaucoma or narrow-angle glaucoma. Unlike open-angle glaucoma, angle-closure glaucoma is a result of the angle between the iris and cornea closing.

Normal-Tension Glaucoma (NTG):

Also called low-tension or normal-pressure glaucoma. In normal-tension glaucoma the optic nerve is damaged even though the eye pressure is not very high. We still don't know why some people's optic nerves are damaged even though they have almost normal pressure levels.

Congenital Glaucoma:

This type of glaucoma occurs in babies when there is incorrect or incomplete development of the eye's drainage canals during the prenatal period. This is a rare

condition that may be inherited. When uncomplicated, microsurgery can often correct the structural defects. Other cases are treated with medication and surgery.

Other Types of Glaucoma

Variants of open-angle and angle-closure glaucoma include:

- Secondary Glaucoma
- Pigmentary Glaucoma
- Pseudoexfoliative Glaucoma
- Traumatic Glaucoma
- Neovascular Glaucoma
- Irido Corneal Endothelial Syndrome (ICE)
- Uveitic Glaucoma

2.2.3: Causes of Glaucoma:

Risk factors for glaucoma include increased pressure in the eye, a family history of the condition, migraines, high blood pressure, and obesity. The most common type is open-angle glaucoma with less common types including closed-angle glaucoma and normal-tension glaucoma. Open-angle glaucoma develops slowly over time and there is no pain. Side vision may begin to decrease followed by central vision resulting in blindness if not treated.

Closed-angle glaucoma can present gradually or suddenly. The mechanism of open-angle glaucoma is believed to be slow drainage of aqueous humor through the trabecular meshwork while in closed-angle glaucoma the iris blocks the trabecular meshwork. Diagnosis is by a dilated eye exam. Often the optic nerve shows an abnormal amount of cupping. It occurs more commonly among older people. Closed-angle glaucoma is more common in women (Casson et al., 2012; Rhee, and Douglas, 2013).

Glaucoma has been called the "silent thief of sight" because the loss of vision usually occurs slowly over a long period of time (National Eye Institution, 2014).

Of the several causes for glaucoma, ocular hypertension (increased pressure within the eye) is the most important risk factor in most glaucomas, but in some populations, only 50% of people with primary open-angle glaucoma actually have elevated ocular pressure (Broman et al., 2008).

Open-angle glaucoma accounts for 90% of glaucoma cases in the United States. Closed-angle glaucoma accounts for less than 10% of glaucoma cases in the United States, but as many as half of glaucoma cases in other nations (particularly Asian countries) (Broman et al., 2008)**.**

Genetics:

Positive family history is a risk factor for glaucoma. The relative risk of having primary open-angle glaucoma (POAG) is increased about two- to four-fold for individuals who have a sibling with glaucoma (Myron et al., 2009).

Glaucoma, particularly primary open-angle glaucoma, is associated with mutations in several genes (including MYOC, ASB10, WDR36, NTF4,and TBK1 genes).

Although most cases of glaucoma do not involve these genetic mutations. Normal-tension glaucoma, which comprises one-third of POAG, is also associated with genetic mutations (including OPA1 and OPTN genes).

Other factors can cause glaucoma, known as "secondary glaucoma", including prolonged use of steroids (steroid-induced glaucoma), conditions that severely restrict blood flow to the eye, such as severe diabetic retinopathy and central retinal vein occlusion (neovascular glaucoma), ocular trauma (angle-recession glaucoma), and uveitis (uveitic glaucoma).

2.2.4: Complication of Glaucoma:

Vision loss from glaucoma, once it has occurred, is permanent, gradually progressive visual field loss, and optic nerve changes (increased cup-to-disc ratio on fundoscopic examination) which lead to irreversible blindness (Casson et al., 2012).

2.2.5: Treatment of Glaucoma:

The modern goals of glaucoma management are to avoid glaucomatous damage and nerve damage, and preserve visual field and total quality of life for patients, with minimal side effects (Parikh et al., 2008).

This requires appropriate diagnostic techniques and follow-up examinations, and judicious selection of treatments for the individual patient. Although intraocular pressure is only one of the major risk factors for glaucoma, lowering it via various pharmaceuticals and/or surgical techniques is currently the mainstay of glaucoma treatment. Intraocular pressure can be lowered with medication, usually eye drops. Several classes of medications are used to treat glaucoma, with several medications in each class.

Each of these medicines may have local and systemic side effects. Adherence to medication protocol can be confusing and expensive, if side effects occur, the patient must be willing either to tolerate them or to communicate with the treating physician to improve the drug regimen. Initially, glaucoma drops may reasonably be started in either one or in both eyes (Leffler, and Amini, 2007).

2.2.5.1: Medications used are:

- Prostaglandin analogs, such as Latanoprost, Bimatoprost and Travoprost, increase uveoscleral outflow of aqueous humor. Bimatoprost also increases trabecular outflow.
- Topical beta-adrenergic receptor antagonists, such as Timolol, Levobunolol, and Betaxolol, decrease aqueous humor production by the epithelium of the ciliary body.
- Alpha2-adrenergic agonists, such as Brimonidine and Apraclonidine, work by a dual mechanism, decreasing aqueous humor production and increasing uveoscleral outflow.
- Less-selective alpha agonists, such as epinephrine, decrease aqueous humor production through vasoconstriction of ciliary body blood vessels, useful only in
- open-angle glaucoma. Epinephrine's mydriatic effect, however, renders it unsuitable for closed-angle glaucoma due to further narrowing of the uveoscleral outflow (i.e. further closure of trabecular meshwork, which is responsible for absorption of aqueous humor).

- Miotic agents (parasympathomimetics), such as pilocarpine, work by contraction of the ciliary muscle, opening the trabecular meshwork and allowing increased outflow of the aqueous humour. Echothiophate, an acetylcholinesterase inhibitor, is used in chronic glaucoma.
- Carbonic anhydrase inhibitors, such as dorzolamide, brinzolamide,and acetazolamide, lower secretion of aqueous humor by inhibiting carbonic anhydrase in the ciliary body.

Both laser and conventional surgeries are performed to treat glaucoma. Surgery is the primary therapy for those with congenital glaucoma. Generally, these operations are a temporary solution, as there is not yet a cure for glaucoma.

2.2.5.2: Side Effects of Glaucoma Medications:

Following are some of the potential side effects of the most commonly prescribed types of glaucoma medications.

-Prostaglandin Analogs: possible changes in eye color and eyelid skin, stinging, blurred vision, eye redness, itching, burning.

-Beta Blockers: low blood pressure, reduced pulse rate, fatigue, shortness of breath, rarely reduced libido, depression.

-Alpha Agonists: burning or stinging, fatigue, headache, drowsiness, dry mouth and nose, relatively higher likelihood of allergic reaction.

-Carbonic Anhydrase Inhibitors: in eye drop form: stinging, burning, eye discomfort, in pill form: tingling hands and feet, fatigue, stomach upset, memory problems, frequent urination.

Side Effects of glaucoma medication, of which the most common being bitter taste, stinging and redness. Dry eye patients who experience symptoms before glaucoma therapy may notice an exacerbation of symptoms once glaucoma drops are added. These effects, when combined with the absence of any observable benefit, may discourage patients from complying.

2.3: Glaucoma Compliance to Medical Treatment (Topical eye drops):

Compliance attributed to many factors like age, gender, level of education, and fear of blindness. Other factors include poor communication with the health care provider, cost of eye drops, forgetfulness, and difficulty in instilling the eye drops (Friedman et al., 2008). Compliance is a multifactorial complex behavior (Friedman et al., 2008).

Previous study have provided insight into the factors associated with glaucoma adherence. Lacey and associates showed adherence to be associated with fear of blindness, forgetfulness, difficulty with drop application, and age (Lacey et al., 2009).

Friedman and associates found adherence to be associated with method of communication, patient education, risk of vision loss, cost, traveling, side effects, and demographic factors. Other researchers have shown that low health literacy is associated with poor adherence (Friedman et al., 2008).

2.4: Determinants of Compliance:

Glaucoma medication adherence could be measured through self-report, pharmacy refill reports, electronic monitoring and direct observation. To be clinically relevant, an 'acceptable' adherence level should be determined by its impact on clinical outcome (Olthoff et al., 2005).

Assessing compliance in ocular treatment is difficult compared to other medical therapies. In other systemic medication, compliance could be assessed by blood level of the medication in addition to the response to treatment. Intraocular pressure (IOP) assessment as an indicator of compliance is associated with "white coat syndrome" with a percentage of patients adhering to their medication regimen in the days preceding doctor visit and declining thereafter (Olthoff et al., 2005).

The degree of compliance was evaluated in this study by using Glaucoma Treatment and Compliance Assessment Tool (GTCAT) compliance, which was calculated, based on the total degree of questionnaire multiple axis. The degree of symptoms and complications related to glaucoma and its medication, were investigated using the

(GTCAT). As were the effect of sex, age, treatment duration, knowledge about the glaucoma medication, number of eye drops and family support for eye drop use.

2.5: Literature Review:

Treatment adherence is a complex behaviour that is influenced by many factors. To date, most glaucoma adherence studies have focused on use of medications, mainly eye drops (Quigley et al., 2007).

Barriers to glaucoma treatment adherence can be divided into three categories according to Mantravadi et al., (2012): provider related factors, medication related factors, with situational/environmental factors. The factors affect compliance with treatment in glaucoma are based on a prospective series of interviews with patients were grouped into three broad categories:

• Environmental and/or situational factors (49 %)
• Medication regimen factors (32 %)
• Patient-related factors (16 %) (Mantravadi et al., 2012).

Adherence and Persistence: The Challenges for Glaucoma Medical Therapy. Study by Skalicky et al., (2013) found that suboptimal adherence and persistence to therapy are major challenges for patients treated with ocular hypotensive medications. The problem affects 5% to 80% of glaucoma patients from all nations, ethnicities, socioeconomic backgrounds, and education levels. Although health care providers are generally poor at detecting suboptimal or poor adherence in the clinical setting.

2.5.1: Patient related Factors with situational/environmental factors:

Evidence regarding the relationship between demographic factors such as race/ethnicity, gender, socioeconomic status, education, family history and age, and glaucoma treatment adherence is largely inconsistent. Ethnic disparities in adherence to glaucoma treatment or glaucoma awareness are often, but not always, noted (Muir et al., 2006;

Taylor et al., 2002). and These associations between glaucoma treatment adherence with education and socio-economic status may be confounded which are often lower among African American patients (National Eye Institute, 2007).

Older patients may exhibit poor glaucoma treatment adherence due to difficulty reading prescription labels (Sleath et al., 2006).

Younger patients (<55 years of age) self-reported non-adherence, had a higher risk of being non-adherent (Olthoff et al., 2009).

Risk factors for poor adherence or non-adherence to topical glaucoma medication regimens obstacles are common in the elderly (e.g., reduced cognition, musculoskeletal problems, and transportation difficulties) (Tsai, 2009).

Older age has not been shown to be a consistent risk factor for poor adherence to glaucoma medication regimens (Tsai, 2009).

A study by Masoud et al., (2013), shows that poor compliance to medical therapy occurred in large percent of the patients, mostly those in the older age groups and those who had no knowledge of the nature of the disease and its treatment

Factors associated with nonadherence included inadequate knowledge get the high percent (32%), underestimation of the disease severity get the second percent (25.5%), while the denial get the lowest percent 15.5% (Masoud et al., 2013).

Physical challenges in self-administering drops are commonly cited barriers to glaucoma adherence (Kahook, 2007).

A study by Gupta et al., (2012), showed that when the eye drop application techniques of 70 open- and closed-angle glaucoma patients were assessed, nine out of ten were unable to instill their eye drops correctly.

A high prevalence of non-compliance, compounded by an inability to instill a drop into the eye due to physical impairment. About half of the patients had difficulty aiming the drop, and other problems including squeezing the bottle, blinking, and seeing the tip of the bottle, Because most of glaucoma patients are old age. The grip strength of patients to and force required to expel a drop from a bottle is affected by ages and diseases like some patients, particularly those with arthritis, could not generate enough force to squeeze a bottle. These same patients also had difficulty with the other movements required to administer drops. Non-adherent glaucoma patients are more likely to have impaired visual acuity or partial vision loss (Sleath et al., 2006).

Data regarding gender differences in glaucoma adherence are inconsistent. General rate of noncompliance, for both genders, was found to be 50%. Compliance rates were unaffected by gender or number of prescribed drugs. Compliance was significantly higher in younger patients (age < 50) and in older patients (age > 80), 63% and 77%, respectively. Noncompliance with glaucoma treatment was found to be common among an Arab population in Israel, particularly between the ages of 50 and 80 (Masoud et al., 2013).

Females had a tendency for higher compliance than male in Egypt (Abu Hussein et al., 2015).

A study by Khandekar et al., (2005) reported that gender per se is not associated with increased noncompliance.

The most pervasive cognitive factor influencing adherence is forgetfulness. Forgetfulness was the number one reported reason for non-compliance (Taylor, 2002).

Forgetfulness, unavailability of eye drops and difficulties with holding the bottle above the eye when applying the eye drops were the most cited reasons for non-adherence (Olthoff et al., 2009).

Fifty percent of the patients indicated that they required more information on the correct administration of eye drops. There was no association between non-adherence and sex, level of education, type of insurance, duration of disease or family history of glaucoma (Olthoff et al., 2009).

Other psychosocial factors that may influence glaucoma treatment adherence include beliefs and attitudes, self-efficacy, and social support. Lack of perceived benefit of treatment or satisfaction with treatment has been consistently associated with lower self-reported adherence (Day et al., 2006).

Results of several studies revealed that the top five barriers included problems with glaucoma patients are:

1) forgetfulness
2) side effects
3) cost/affordability
4) eye drop administration

5) the eye drop schedule (Lacey et al., 2009; Stryker et al., (2010); Laura et al., 2013; Masoud et al., 2013).

The most salient top five facilitators were :

1) fear or thoughts about the consequences of not taking eye drops

2) use of memory aids, cues, or strategies

3) maintaining a regular routine or schedule for eye drop administration

4) ability to afford eye drops

5) keeping eye drops in the same area (Lacey et al., 2009; Stryker et al., (2010); Laura et al., 2013; Masoud et al., 2013).

A study was done in Haifa and Western Galilee District, focusing on physicians' role barriers to adherence were found to be low income, and believing that 'It makes no difference to their vision whether they took the drops or not', and relying on someone else for drop instillation (Castel et al., 2014, pp:459).

Glaucoma medication compliance was assessed by Yoo, and Hwang (2015), they found that the most frequently found number of days of missing medication per month was one to four (43.4%). The most common reason for missing medication was forgetfulness (80.5%), followed by busy daily schedule, and complications of medication (1.1%). Older age, longer duration of treatment, higher knowledge about the glaucoma medication, and the presence of family support was significantly associated with a higher compliance score ($p < 0.05$). Sex, number and class of eye drops, and Glaucoma Symptom Scale(GSS) did not significantly affect compliance score.

Patient age above 50 years and low level of education and negative family history of glaucoma were factors significantly associated with poor compliance (Abu Hussein et al., 2015).

Glaucoma Patient Expression of Medication Problems and Nonadherence study done by Slota et al., (2015). The purpose of this study was to examine if patient demographic factors influence self-reporting of medication side effects, difficulty with drop instillation and non-adherence to glaucoma therapy. The Results of this study found that patients with lower health literacy were significantly less likely to express problems with side effects and eye drop administration during the visit.

2.5.2: Treatment Related Factors:

The cost, complexity of taking multiple medications for multiple diseases, change in dosing schedules and side effects of medications are all well-known reasons for nonadherence (Nordstrom et al., 2005). If glaucoma patients have no external help this lead to complicate their medication adherence. Once-a day dosing with prostaglandin and beta-blockers have a better persistency (Nordstrom et al., 2005).

The number of medications, the number of doses of each medication, and the specific instructions for medication taking have all been used to represent medication regimen complexity. Higher daily dose frequency, especially of more than two administrations per day, is usually associated with increased glaucoma medication non-adherence. Forgetfulness, the main reason given by patients who missed one or 2 doses a week, inconvenience, and un affordability (Quigley et al., 2007).

Taking a higher number of drops per day, and taking a prostaglandin drug are considered a barrier to compliance in glaucoma patients this due to the side effects of prostaglandin eye drops (Castel et al., 2014).

The frequency of instillation per day affected compliance significantly, although studies have shown that a single daily drug dose or combination is associated with better compliance rates (Buchan et al.,2007).
Results from the Collaborative Initial Glaucoma Treatment Study suggest that 75% of glaucoma patients will be on at least two types of eye drops two years following their initial diagnosis (Parrish et al., 2009).

Factors leading to poor compliance were high drug cost, non-availability of drugs and side effects of medication also pose barriers to glaucoma medication adherence. The cost of glaucoma medications has been cited as a medication adherence barrier in most studies (Sleath et al., 2006; Tsai, 2009).
Medication cost, limited health insurance, disease severity, and role of complicated dosing regimens, have varied effects based on the patient population studied and the definition of adherence. Poor medication adherence also is associated with decreased adherence to follow-up medical visit schedules (Tsai, 2009).

Polytherapy and lack of medical insurance could be contributing factors for noncompliance in glaucoma patients (Abu Hussein et al., 2015).

Patients who expressed a problem with eye drop administration and with side effects were significantly more likely to express medication non-adherence to their ophthalmologist. Patients who reported greater than 80% medication adherence during the interview were significantly less likely to express non-adherence to their ophthalmologist (Slota et al., 2015).

2.5.3: Provider Related Factors:

Adherence is better achieved where physician take proactive role in discussing with patient regarding their disease and use of medication. An open discussion regarding dosing, side effects, cost of medication, early and more frequent follow ups in the beginning usually help in developing a better understanding between patient and the physician. Communication between physicians and patients is a key factor in compliance for glaucoma patients (Taylor et al., 2002).

Communication in medical care is highly correlated with better patient adherence, and training physicians to communicate better enhances their patients' adherence (Kelly et al., 2009). Communication is thus an important factor over which physicians have some control in helping their patients to adhere (Kelly et al., 2009).

Non-adherent participants with treatment were less likely to believe their eye doctors spent sufficient time with them, ask their eye doctor if they had any questions, knew of benefits to taking their glaucoma medication regularly (Stryker et al., 2010).

Moreover factors leading to poor compliance were poor understanding of the doctor's instructions on how to use the drugs (Castel et al., 2014). However, Castel found that there is no association was found between the patient's relationship with the family physician and adherence to glaucoma treatment (Castel et al., 2014).

A study published in (2015) conclude when providers educate glaucoma patients and assess patient views about glaucoma and its treatment, patients report higher medication self-efficacy. Providers should be aware that patients who ask more medication

questions may have less confidence in their ability to overcome barriers to adherence (Sleath et al., 2015).

Okeke et al., (2009), found that patients are more compliant just before and just after doctor visit, with 55% of patients taking 75% of their required drops.

2.5.4: Glaucoma related Factors:

Diseases that are asymptomatic are more prone to poor patient compliance (Dimatteo et al., 2005).

Poor compliance with treatment is known to influence glaucoma progression (Sleath et al., 2011).

compliance to topical anti-glaucoma medication has always been a major problem. This is greatly because treatment aims to stop or delay progression of the disease and there is absence of immediate visual restoration felt by the patient (Kass et all., 2002).

Patients with glaucoma are largely not reminded by the disease process itself of the importance of taking medications as prescribed (Mantravadi et al., 2012).

Chapter Three

Conceptual Framework:

This chapter aims to critique the current theoretical models, in order to locate the research problem within the broader conceptual framework, and to explain health behaviors such as compliance with treatment.

The researcher focused on the Health Belief Model, which is used in this study as a conceptual framework, its origin, development and components.

3.1: Conceptual Framework Definition:

Conceptual frameworks are particularly useful as organizing devices in empirical research. One set of scholars has applied the notion of conceptual framework to deductive, empirical research at the micro- or individual study level (Shields et al., 2013). The conceptual framework used to predict the influences on compliance with ant-glaucoma treatment in specific population (glaucoma patients) is adaptive of the HBM.

The theoretical framework which employed in this study is the Health Belief Model (HBM), which is the most common motivational model of compliance.

It holds that; an individual's cooperation with health advice depends on the extent of the person's perception and susceptibility to the seriousness of the disease, treatment efficacy, and how to overcome barriers to compliance. Cause to action is added to the model to study the influence of external factors.

The HBM explains the relationship between an individual’s belief and behavior and defines the factors that motivate or demotivate an individual to do certain health-related actions, and the conditions that are effective in displaying health behaviors in particular (Sheeran, and Abraham, 1996).

The HBM assumes that an individual's perception of the susceptibility and severity of an illness produces the readiness to take a health action to reduce the health threat. The model includes four dimensions: (a) perceived personal susceptibility to a disease, (b) perceived severity if contracted the disease, (c) perceived benefits of a particular health action and (d) perceived barriers taking a particular health action (Sheeran, and Abraham, 1996).

the Health Belief Model constructs, which include the severity of the disease, susceptibility to the disease, the benefits offered by a recommended action, and the barriers to taking said action. The mediating factors of self-efficacy (individual's perception of his or her ability to perform a recommended action) and cues-to-action (external encouragements to perform a recommended action) have been added to the original four constructs. The Health Belief Model is a psychologically driven framework of concepts designed to explain and predict health behaviors by examining individuals' beliefs and attitudes regarding diseases and their treatments. It predicts preventive, screening, and/or treatment adherence based on value expectancy theory, which examines the value individuals place upon their current state of health and their expectancy that some action will maintain or improve that state (Strecher, and Rosenstock, 1997).

For example, under the Health Belief Model theory, a person with glaucoma will be more likely to comply with treatment regimens if he or she places a high value on his or her current level of vision and also believes than an ocular hypotensive medication will prevent further vision loss.

The Health Belief Model (HBM) was employed in the current study as theoretical framework. The questionnaire, interpretation and discussion were also depend on this model. The Health Belief Model (HBM) served as the conceptual framework of this study.

3.2: Conceptual Framework Components:

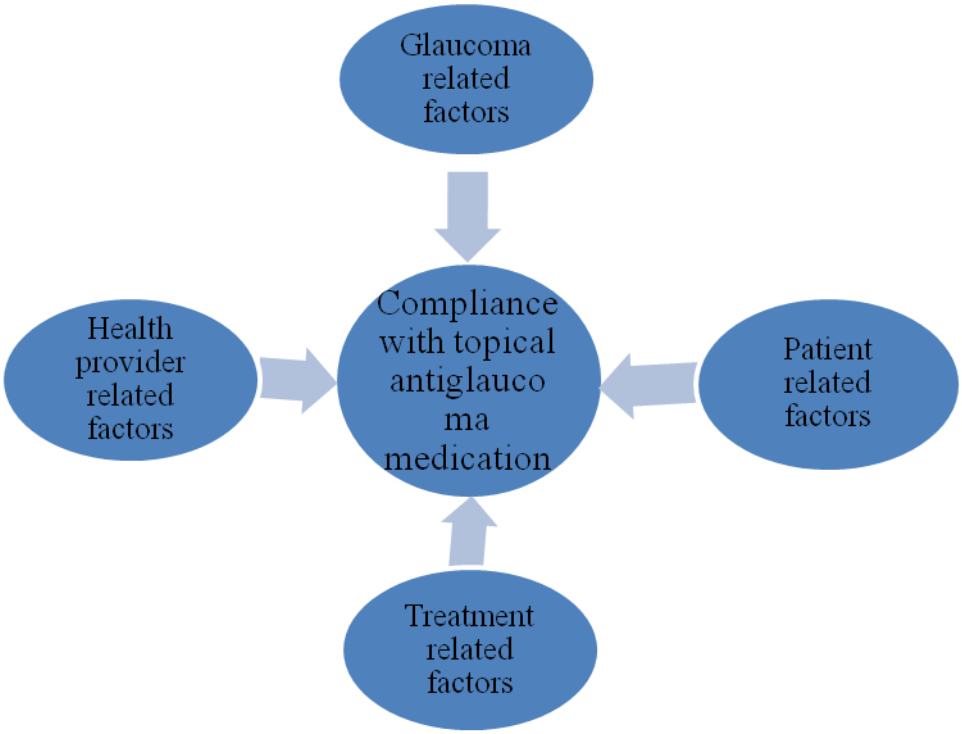
The following graph represents the relationship between the dependent variable "compliance with topical anti-glaucoma treatment" , and the independent variables that affect compliance;

• Patient-related factors (socio demographic and economic factors).

•Glaucoma related factors (Knowledge &Attitude toward glaucoma)

• Treatment related factors

• Health provider-related factors



Graph 3. 2: Conceptual Framework of the study.

3.3: Study Variables

The dependent variable in the study was, compliance with topical anti-glaucoma medication, compliance has been defined as the extent to which patients' behaviors correspond with physician's recommendations. Compliance, as following the regimen on a daily basis. Patient compliance to their medication regimen is essential for treating most chronic diseases; glaucoma is no exception.

Medication compliance: The extent to which a person's behavior coincides with medical or health advice.

Dependent variable:

Adherence vs. Compliance

1. The two terms are considered synonyms.
2. Adherence: from patients' perspective (the fact of behaving according to a particular rule)
3. Compliance: from health care providers' perspective (obeying rules or requests made by people in authority)

Glaucoma adherence is difficult to measure. Patients routinely overestimate their level of adherence with self-report as compared with objective measures. Intraocular pressure is a poor surrogate for adherence because patients commonly increase their adherence in the day prior to visiting their eye care provider. (Kass et al., 2002)

Independent Variables:

The independent variables which are affecting compliance to topical anti-glaucoma medications are:

* Patient related factors: socio-economic factors and socio-demographic characteristics like Age, sex, marital status, educational level, place of residence, Family support, and visual acuity. Occupation and monthly family income (employment), insurance coverage, social status, cost of the treatment.

* Glaucoma related factors: severity and duration of glaucoma, duration of treatment, and comorbidities. Awareness and knowledge about glaucoma treatment, intraocular pressure, health beliefs and attitudes.

* Treatment related factors: number, frequency, and side effect of medication(s), financial difficulties, and problem to obtain the medication(s).

* Provider related factors: trust between patient and physician, enough information about glaucoma, treatments, and teaching patients about eye drop administration from physician and other health team.

3.4: Study Variables Definitions (Operational Definitions):

3.4.1: Glaucoma:

Glaucoma is a group of eye diseases which result in damage to the optic nerve and irreversible vision loss. A major risk factor is increased pressure in the eye (Casson et al., 2012).

3.4.2: Intraocular pressure (IOP):

Intraocular pressure (IOP) is the pressure of fluid inside the eye. Tonometry is the method eye care professionals use to determine this. IOP is an important aspect in the evaluation of patients at risk from glaucoma. Most tonometers are calibrated to measure pressure in millimeters of mercury (mmHg) (Farandos et al., 2014).

Normal eye pressure ranges from 12-22 mm Hg, and eye pressure of greater than 22 mm Hg is considered higher than normal.

3.4.3: Topical treatment:

A topical medication is a medication that is applied to a particular place on or in the body, as opposed to systemically. (The word topical derives from Greek topikos, "of a place".) Most often this means application to body surfaces such as the skin or mucous

membranes to treat ailments via a large range of classes including creams, foams, gels, lotions, and ointments, such as eye drops applied to the conjunctiva (Psoriasis-Treatmen, 2009)

Treatment is defined as "medical care for an illness or injury" (Treatment, 2013), in this study, topical treatment is defined as the use of an approved pharmacologically active medicinal substance for the purpose of controlling Intra Ocular Pressure (Glaucoma).

3.4.4: Compliance with prescribed topical anti-glaucoma treatment:

Compliance was defined using GTCAT after convert all negative statement to positive and choose cut point to be 3.33 any results of the total set of axis less the cut point consider noncompliance, while results above this point were considered compliance.

3.4.5: Glaucoma patient:

A person diagnosed with glaucoma and receiving topical treatment (eye drops).

The next table identifies the variables used in this study, operational definition, according to the literature.

Table 3.4: Operational Definitions of the Variables (Abu Hussein et al., 2015):

Variable	Operational definition
Age (AGE)	Age of the glaucoma patients at the time of survey and filling questionnaire, measured in years.
Level of Education	Number of years formal schooling completed, primary, secondary, graduated, higher educated –Diploma, PA, Master .
Awareness	Having knowledge about the danger of glaucoma and also about the benefit of compliance to topical medication and ophthalmic screening, awareness implies knowledge gained through means of information, understanding of, appreciation of, recognition of, attention to.
Family income (INC)	Total family income per month by NIS: total compensation received by all family members age 15 or older living in the same household for at least one year. It may include business, farming, rent, interest, wages.

Health insurance	Having any type of health insurance, governmental, UNRWA, private or other types of insurance that protect the financial well-being of the individual by covering health services costs (screening, follow up, and required treatment).
Health care provider	A person who helps in identifying or preventing or treating illness or disability or health services to health care consumers.
Family History of glaucoma	Having a first degree close relatives with glaucoma like: father, mother, and brethren.
Number of Doses per day (dosing frequency)	The number of times per day for which medication was prescribed to glaucoma patients.
Side Effects of glaucoma medication	Undesirable effect of medication, most common being bitter taste, stinging, redness and dry eye.
High Cost of drug	Cost over glaucoma patient willingness and ability to pay
Single drug	Use of one eye drop
Combined drug	Use of two or more eye drops
Comorbidity	Patient has any physical impairment that may affect compliance with topical anti-glaucoma treatment these include (DM, HTN, CAD, arthritis), beside having difficulty in instilling eye drop like: difficulty aiming the drop, squeezing the bottle, blinking, and seeing the tip of the bottle.
Visual acuity	Sharpness of vision, especially as tested with a Snellen chart. Normal visual acuity based on the Snellen chart is 20/20.

Chapter Four

Methodology

4.1: Introduction:

This chapter aims to outline the methodology, explain and define the study's design and setting, also to explore the participants sample size and the choice of target sample. Study tool, followed by a statistical method to analyze the data.

4.2: Study Design:

This study used a quantitative, descriptive and cross-sectional survey design within SJEHG which was carried out on glaucoma patients, to assess the level of glaucoma patient compliance to topical anti-glaucoma medication. And to determine the factors that influence glaucoma treatment adherence with using of topical anti-glaucoma in order to develop an intervention for a specific population (glaucoma patients) and to help them to enhance their compliance. The study was conducted between November 2016 and January 2017.

This method was easily applicable and cost effective. Also it is consider a technique which enables the researcher to collect numerical data and answer the research question in a short period of time (Ethridge, 2004).

4.3: Study Settings:

The settings of data collection, were SJEHG outpatient glaucoma clinics in three cities Jerusalem in the middle, Hebron in the south, and Anabta in the north.

4.4: Study Population:

The study population was comprised of glaucoma patients attended outpatient glaucoma clinics to be treated, at SJEHG in (Jerusalem, Hebron, and Anabta). In 2016, around 1600 patients were treating at the SJEHG, of those who attended, 332 targeted to reach 320 patients were selected (convince), while they waited to see the specialist, and invited to participate in this study.

4.4.1: Inclusion criteria:

The criteria of sample selection were based on the following criteria which were:

- Aged 18 years and older.
- They had been diagnosed as having chronic glaucoma, by a consultant ophthalmologist.
- They had been prescribed medication for glaucoma, and were taking daily doses of topical glaucoma treatments for at least one year.
- Agreed to participate in the research and data collection.

4.4.2: Excluded criteria:

- Were too sick to be interviewed.
- Participants who had eye surgery related to glaucoma within 3 months of the date of medical chart review were excluded.
- Especial condition, such as senile dementia, was present which rendered them unsuitable for participation.

4.5: Mechanism of Sample Selection (Sampling method):

Patients who were attending the out-patient glaucoma clinics at 3 cities (Jerusalem, Hebron, and Anabta in Palestine) and coming for a follow-up within the study period (three month from November 2016 to January 2017), were invited to join this study, interviewed and their medical records were reviewed. 332 invited to join study, twelve of them did not participate: 4 were physically too ill, and 8 refused to co-operate.

A convince sample of glaucoma patients was used to select the participants from three outpatient clinics. The researcher selected starting point (M: first patient attended glaucoma clinic in each city) and picked the subject until 320 subject were gathered from all clinics of SJEHG (Jerusalem, Hebron, and Anabta).

4.6: Sample Size:

The sample was calculated depending on the review of outpatient glaucoma clinics in the last two years (2015/2016). I observed and estimated the total number of patients who visited the outpatient clinics for follow up, or were newly diagnosed with glaucoma. According to the estimated number of patients and after revising it with a statistical specialist. The minimum sample size was calculated using a formula used to estimate the sample size for a single population (Daniel, 1999):

$n = (Z1- \alpha /2)^2 (p \times q) /d 2$

Where:

- n = the desired sample size when population is >10,000
- Z1-α/2 = the standard normal variable at (1- α) % confidence level and αis the level of significance. At a 95% confidence level, the value of this parameter is 1.96 that was used in the study.
- p = the positive character (expected prevalence)
- q = the negative character
- d = the degree of accuracy (absolute precision) required, usually set at 0.05

Since there was no information from similar studies, past studies, or studies done on similar populations and no pilot study about the proportion was done, a conservative sample estimate was used assuming that the sample was independent and randomly selected.

$n=(Z1-\alpha2)2(p\times q)/d2=(1.96)2\times0.5\times0.5(0.05)2=384.16\approx384$

As the estimated total study population is < 10,000, correction formula was then used. Therefore,

$nf=n/1+n/N=384/1+384/1600=384/1.24=309.6\approx310$

Where:

- nf = the desired sample size when population is <10,000
- n = the desired sample size when population is >10,000
- N = the study population size

I added three percent contingency (310×3% =9.3) for non-respondents to the computed value. Finally, the minimum required sample size was calculated to be 310 + 10 = 320.

I divided the estimated total number of glaucoma patient who attended SJEHG by the lowest number of glaucoma patient who attended the Hebron glaucoma clinic which was 250 patients (1600/250; the result was 6.4). Then the number of sample was divided by the number of patients in each clinic which represents 6.4 quotas from divided 320/6.4=50 subject in each quota, I gave Jerusalem outpatient glaucoma clinics which had 1000 glaucoma patients 4 quotas from the total sample size (50*4=200). Hebron outpatient glaucoma clinic contained nearly 250 glaucoma patients given one quota (50*1=50). At the Anabta outpatient glaucoma clinic the researcher selected 70 patients randomly from 350 patients which represent one and half quota (50*1.5=75).

4.7: Study Tool:

The Questionnaire was the instrument of research, because it is an inexpensive way to gather data from a large number of respondents. (Ethridge, 2004) A pre-used and standardized questionnaire was used to collect the data from the study sample. The psychometrics of the Glaucoma Treatment Compliance Assessment Tool (GTCAT), questionnaire designed by An American Ophthalmological Society (Mansberger et al., 2013), to assess adherence with glaucoma therapy. This questionnaire includes items related to the six Health Belief Model constructs, as well as other relevant information, such as age, medical history, gender, income, education levels, and type of insurance coverage. Most questions include a 5-interval Likert scale response with anchoring definitions (eg: 1=absolutely disagree, 5=absolutely agree).

The GTCAT is questionnaire to study glaucoma medication adherence. It was developed using expert opinion, previous studies regarding adherence in glaucoma

patients done by Granstrom (1982), Kass et al., (1986), and Winfield et al., (1990), and the Health Belief Model. The Health Belief Model is a psychologically driven framework of concepts, designed to explain and predict health behaviors by examining individuals' beliefs and attitudes regarding diseases and their treatments. It predicts preventive, screening, and/or treatment adherence based on Value Expectancy Theory; which examines the value that individuals place upon their current state of health and their expectancy that some action will maintain or improve that state. (Strecher, and Rosenstock, 1997)

4.7.1: Validity

Validity is the degree to which any instrument succeeds in describing or quantifying what it is designed to measure (Jonathan, 2007). And validity refers to how well a test measures what it is purported to measure.

Questionnaire was evaluated by using data from a cross-sectional study with focus groups (n = 20) and a prospective observational case series (n=58). Principal components analysis provided assessment of construct validity. Predictive validity was high, with several Health Belief Model questions significantly associated (P <.05) with adherence and a correlation coefficient (R (2)) of .40 (Mansberger et al., 2013).

4.7.2: Reliability

Reliability is the degree to which an assessment tool produces stable and consistent results. Also, reliability of a measure is the degree to which a measurement technique can be depended upon to secure consistent results upon repeated application (Jonathan, 2007).

The reliability of the tool in this study was estimated using Cronbach's alpha coefficient (Cronbach's alpha). "Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct, and hence it is connected to the inter-relatedness of the items within the test" (Tavako, 2011).

Mansberger et al., (2013) repeated the questionnaire after 3 months for test-retest reliability. They evaluated predictive validity using an electronic dosing monitor as an objective measure of adherence. Focus group participants provided 931 statements related to adherence, of which 88.7% (826/931) could be categorized into the constructs of the Health Belief Model. Perceived barriers accounted for 31% (288/931) of statements, cues-to-action 14% (131/931), susceptibility 12% (116/931), benefits 12% (115/931), severity 10% (91/931), and self-efficacy 9% (85/931). The principal components analysis explained 77% of the variance with five components representing Health Belief Model constructs. Reliability analyses showed acceptable Cronbach's alphas (>.70) for four of the seven components (severity, susceptibility, barriers [eye drop administration], and barriers [discomfort]), which may be considered as acceptable. Test-retest reliability was 90%. The GTCAT shows excellent repeatability, content, construct, and predictive validity for glaucoma adherence (Mansberger et al., 2013).

The study tool (questionnaire) was used by Kowal et al., (2008) to study the obstacles to medication compliance for patients with glaucoma, in glaucoma out-patient clinic of the Department of Ophthalmology, Medical University, Lublin, Poland and regional out-patient clinics.

For the purpose of this study, the tool was adapted and translated into Arabic, by two specialist ophthalmic staff nurses, reviewed by the only glaucoma specialist in Palestine whose works at SJEHG Dr. Amer Muhsen and SJEHG nursing coordinator Mr. Ahmad Ma'ali PhD. Then it was given to the quality manager Mr. Waleed AL-Kateeb MD at SJEHG to translate back to English to make sure we didn't lose the value and the meaning in the translation in order that the tool is still valid. Also the questionnaire was inspected by an Arabic lingual inspector to evaluate its language level suitability and to correct if for any mistakes in grammars or dictation. Then it was given randomly to a limited number (5) of glaucoma patients in glaucoma clinics at Jerusalem, Hebron, and Anabta to give me their recommendations or suggestion to make all questions in the questionnaire clear and easy to be filled even by patient or by researcher assistants. This was before starting the pilot study. The final structure consisted of 68 closed and open-ended questions divided in two parts, which could be completed within 20-28 minutes, and it had been numbered for entering data and analysis easily.

Section one of the questionnaire included 21 questions concerning social demographic and personal characteristics of the participants, such as the age, marital status, educational level, occupation, family income, if the participant has any type of health insurance.

Section two of the questionnaire objectives were to measure knowledge and attitude toward compliance and glaucoma, through asking the participants 49 questions were consisted in this part (1.2.3.4.5.6.7.8.9.10.11.12).
Also questions about the benefits of compliance with topical anti-glaucoma treatment, the questions of this part had statements as stem followed by variation of answering, strongly disagree, disagree, don't know, agree, strongly agree.

The questions need closed answer options, by tick marked under the choice that best described their beliefs and opinions from multiple choices.
Questions aimed to measure the extent to which participants agree with positive statements regarding their beliefs about the factors that affect their compliance with topical anti-glaucoma treatment, these barriers were identified by listing 18 possible barriers, divided into four parts, personal related barriers include 29 statements, anti-glaucoma treatment related barriers 11 statements, glaucoma related barriers 4 statement, other statements 45.46.47 to measure the health provider related barriers .

A 5-point Liker scale used in this section to assess intensity of agreement of the glaucoma patient, through marked the statement with any level of agreement, by putting (x) in the box regarding their beliefs and opinion.

Some of the statements which are listed in this part to measure the potential of personal related barriers were (1.2.3.4.5.6.7.8.9.10.11.12.20.21.22.23.24.25).
Barriers related to topical anti-glaucoma treatment (13.14.15.26.27.28.29.30.31.32.33).
Questionnaire constructed and reviewed by the specialist, (annex B), and tested for the reliability and validity, through a pilot study (annex D), then it was approved by the instructor to be ready for data collection.

4.8: Pilot Study, Validation of the questionnaire:

The pilot study was conducted to help the researcher examine the feasibility of the approach that was intended to be used in a larger scale study, to design a research protocol, to assess whether the research protocol was realistic and workable, and to establish whether the sampling frame and technique were effective.

After developing the questionnaire, a pilot study was conducted on 5% from the sample (17) patients who were treated at SJEHG (Jerusalem middle 10, Hebron south 3, Anabta north 4). The Questionnaire was filled through face-to-face interview, patients was asked for feedback, and testing of the questionnaire, wording accuracy, readability, simplicity, content and face validity, also to estimate the time required to fill the sheet. Pilot study was carried out from 26 October to 30 October 2016. Patients who participate in pilot study weren't included in the study.

Statistically, all statements in the questionnaire were numbered and coded, to easily enter the generated and gathered data from the participants then data was analyzed. The pilot study was analyzed, and based on the reliability alpha; the instrument revealed high Cronbach's alpha values more than 73.3% as shown in the next table.

Table 4.8: Represent the results of Cronbach's alpha values.

	Barriers	Cronbach's Alpha
1	Knowledge of patient's about glaucoma disease	% 51. 2
2	Awareness of glaucoma patient's to the severity of their disease (glaucoma)	% 93. 6
3	Barrier to compliance with treatment	% 31. 9
	Cause to action questions and Self reported compliance	% 76. 8
	Patient –physician relationship	% 63. 3
Total degree		% 73. 3

Based on the results of the pilot study, the necessary adaptation and some modification occurred to some changes, some changes were adopted by the researcher, following the pilot study. A result of the researcher obtaining a deeper understanding of the reality on the ground. After validation of the Arabic translation of the Glaucoma Treatment Compliance Assessment Tool (GTCAT), approval to conduct the survey was obtained from the supervisor of the thesis, at Al-Quds University, who has been involved and

consulted at every step. His advice has been valuable, and his observations and remarks were considered and followed, throughout the study and subsequent reporting.

4.9: Data Collection:

The scientific method applied in data collection process, after defining problems and issues, several meetings were held with interviewers " 6 nurse students", discussed the feedback of the pilot study, to improved the performance, focused on the objective of the study to administer the questionnaire .

The mechanism of sample selection explained, and terms of choosing the participants, and how to fill out the questionnaire accurately, and the interviewers were able to clarify all questions for glaucoma patients through face-to-face interview.

Starting points in the process of filling the questionnaires in every clinics selected, a plan of daily work developed, in order to complete the filling of 320 printed questionnaires 332 of those patients who attended where selected (convince) . As planned in the process of selecting the sample, in November 2016, we began the process of filling out the questionnaires.

All participants were given a full explanation of the methodology and purpose of the research, assurance of confidentiality of all information. Participants were also assured that their participation in the study was voluntary; they could refuse to participate at any time during the interview without affects their treatment.

Participants were invited to private office interview, using pre-tested validated questionnaire available in Arabic. One to one interview was done by trained interviewers. The interview took around 28 minutes and was usually done on one of the patient's follow-up visits. The interviewer also tried to stress the value of accurate information rather than gain positive impression and shared the concept that failure to take medication as prescribed due to many personal, social, and economic factors is a common problem. Medical charts of the patients were reviewed to abstract IOP of both eyes, and visual acuity of glaucoma patients.

After confirming the validity of the filling of all questionnaires, data cleaned, reviewed and audited, the data generated on the questionnaires were numbered and validated manually for errors and entered for analysis by SPSS version18.

4.10: Statistical method / Data Analysis:

The quantitative data sets collected from participants were cleaned, coded, and entered into the Statistical Package for the Social Sciences (SPSS 18).

All coding and data entries were verified, frequency distributions were calculated for all variables, and incorrect codes were identified and corrected.

SPSS was also used for descriptive statistics on the characteristics of research participants and to analyze and interpret the results.

Descriptive statistics, including percentages, means, standard deviation (SD), were calculated. ANOVA test was used to recognize association between knowledge about glaucoma and demographic factors, sex, age, marital status, education….etc.

Differences between means of variables by compliance to anti-glaucoma topical treatment were calculated with Chi -Square test .

Multiple linear regression (stepwise regression) used to factors that most affect the degree of compliance, analysis with topical glaucoma treatment -use compliance as the dependant variable was performed for the entire participants, these were hypothesized to be associated with compliance with topical glaucoma treatment -use suggested in the literature.

Chapter Five: Results

Research Findings

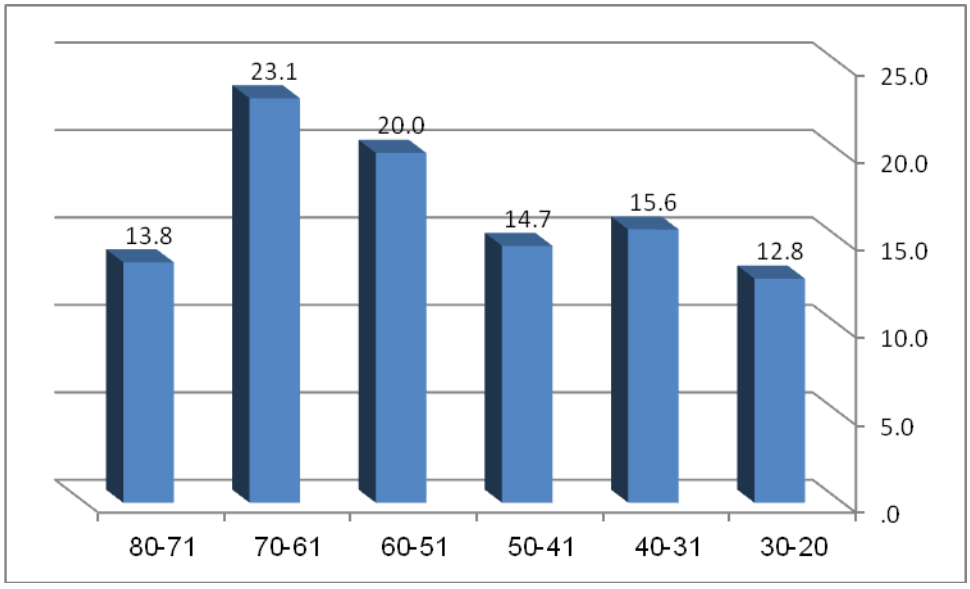
5.1: Introduction:

This chapter aims to review the findings of study. The first section, biographical data such as age, gender, marital status, educational level, household income, health insurance,…..etc findings related to glaucoma patient characteristics and compliance with topical anti-glaucoma treatment were represented.

5.2: Demographic characteristics of respondents:

5.2.1: Age of participants:

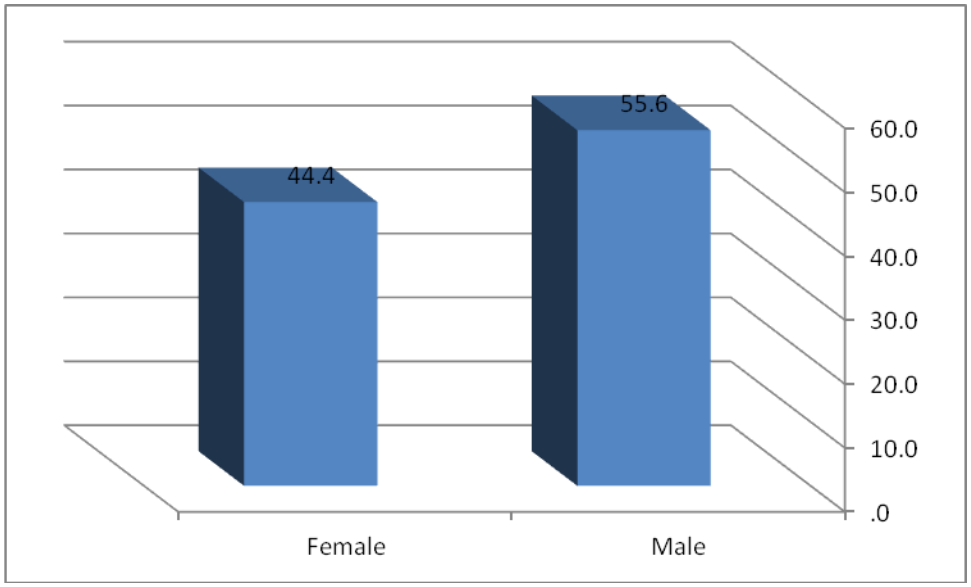
Most age group frequencies of the sample was between the age (61-70) years (23.1%), followed by (20.0%) were between (51-60) years, and the lowest age group was from (20-30) (12.5%) as (5.2.1) graph shows:



Graph 5.2.1: Represent the frequencies of age group of the sample respondents.

5.2.2: Gender of the participants.

Graph (5.2.2), shows the frequencies of sample gender : the sample consists of (320) respondents, (178) male (55.6%), and (142) female (44.4%).



Graph 5.2.2: Represent the frequencies related to the gender of participants.

5.2.3: Marital status of the participants:

Marital status of the participants is presented in the table below (5.2.3). Most of the participants (60.6%) were currently married, followed by (17.8%) were widowed, (15.9%) were single, and those divorced were the remainder (5.6%), as (5.2.3) table shows:

Table 5.2.3: Frequencies of the distribution of marital status of the sample:

Marital Status		
	Frequency	Percent
Single	51	15.9%
Married	194	60.6%
Divorced	18	5.6%
Widowed	57	17.8%
Total	320	100.0%

5.2.4: Educational level:

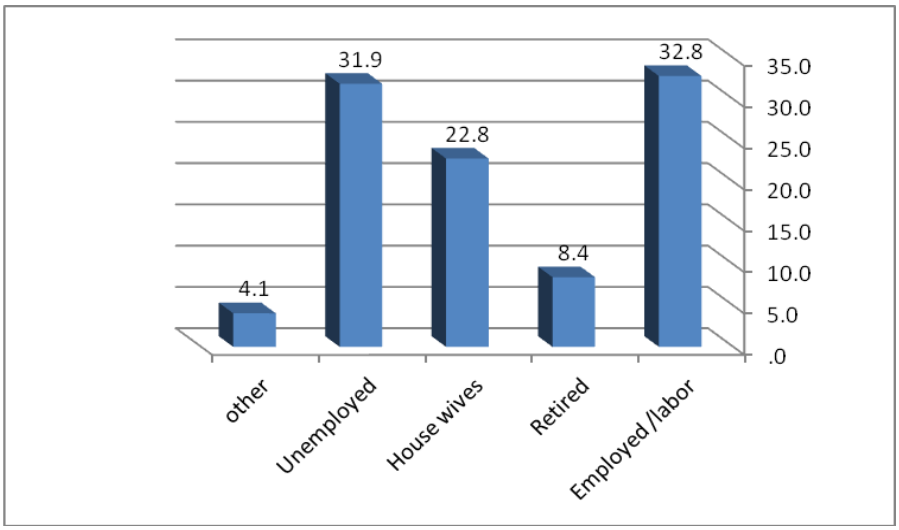
Regarding to their educational attainment, the sample was generally educated, since (19.7%) have university graduated with BA, (12.5%) were with diploma, and those with primary and secondary school were (30.0%), (24.1%) respectively, (2.2%) were with master degree, and (11.6%) of the sample were illiterate, as (5.2.4) table shows:

Table 5.2.4: Frequencies of the distribution of Educational level of the sample:

Educational Level		
	Frequency	Percent
Illiterate	37	11.6%
Primary School	96	30.0%
Secondary School	77	24.1%
After School Education (Diploma, BA, Master degree)	110	(12.5%; 19.7%; 2.2%) 34.4%
Total	320	100.0%

5.2.5: Work status of the participants:

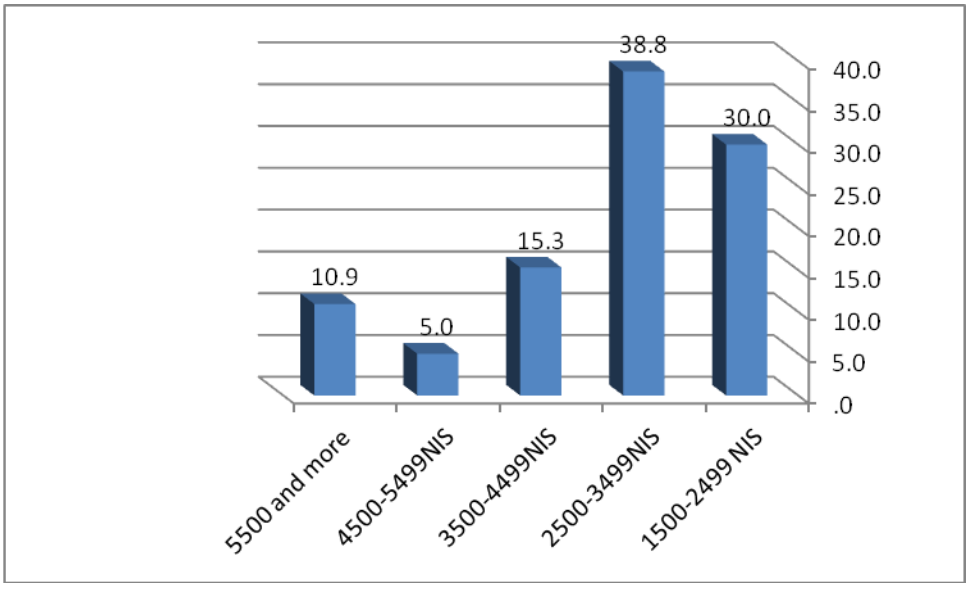
According to their work status, (32.8%) of the sample were employed, (31.9%) were unemployed, (22.8%) housewives, and those retired were rated (8.4%), as graph (5.2.5) shows:



Graph 5.2.5: Represent frequencies of the distribution of work status of the participants.

5.2.6: Monthly Income of the participants (glaucoma patients):

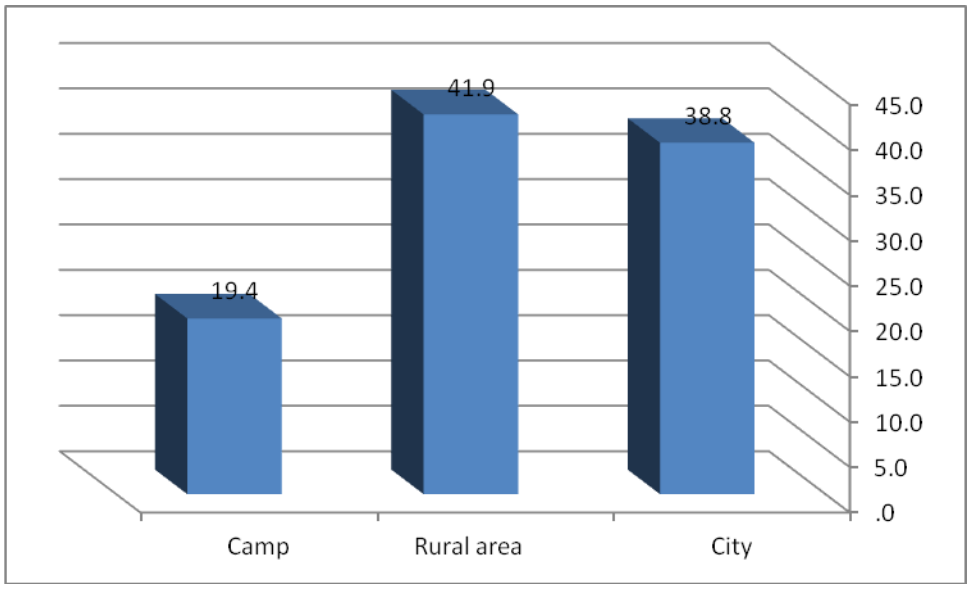
The following graph (5.2.6), represents the values of the families income, (38.8%) of the sample their incomes between (2500-3499) NIS monthly, (30.0%) between (1500-2499) NIS, whereas (15.3%) their income were between (3500-4499) NIS, (5.0%) between (4500-5499), and the remainder (10.9%) estimated their income more than (5500) NIS.



Graph 5.2.6: Percentages of Monthly Household Income by NIS.

5.2.7: Residence of the participants (glaucoma patients):

Most of the participants were from rural area (41.9%), followed by (38.8%) were from cities, and (19.4%) were from refugee camps as (5.2.7) graph show.



Graph 5.2.7: Represents frequencies of glaucoma patient participants Address/ Residence

5.2.8: Having Health Insurance:

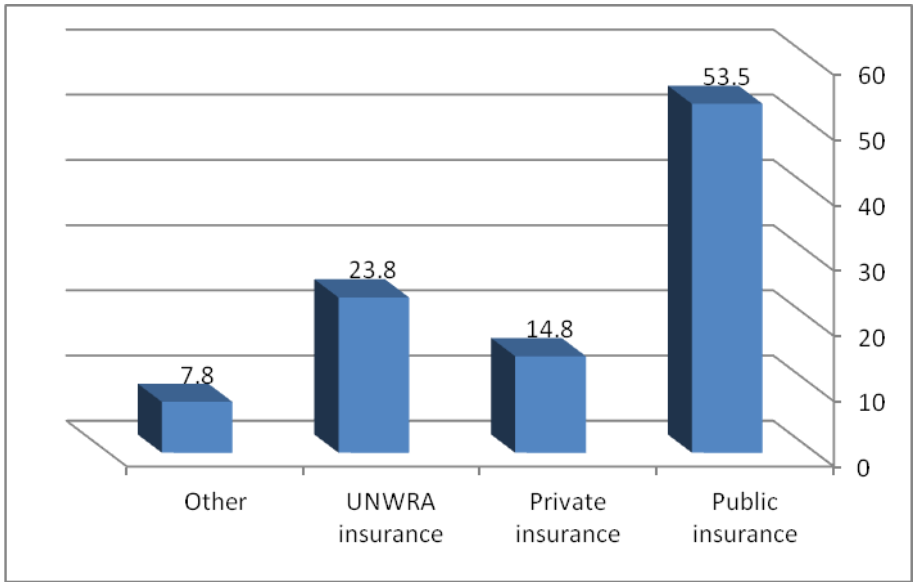
Table (5.2.8), shows the percentage of the health insurance as seen high percents of the participants have health insurance (80.0%), while (20.0%) without any type of insurance.

Table 5.2.8: Represent the percentage of health insurance for the family":

Health Insurance		Frequency	Percent
Valid	Yes	256	80.0%
	No	64	20.0%
	Total	320	100.0%

5.2.9: Type of Health Insurance:

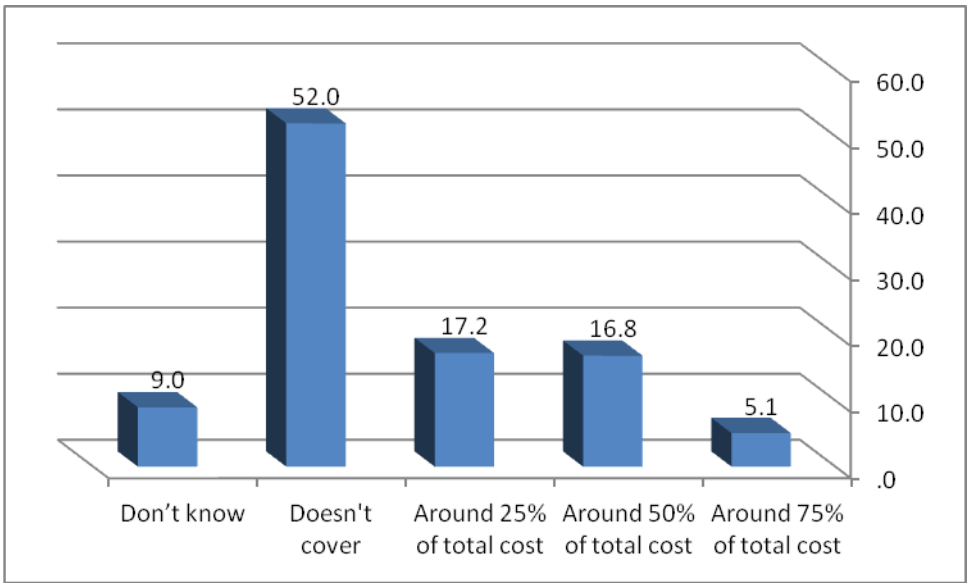
Most of the participants have public insurance (53.5%), (23.8%) have UNRWA insurance, (14.8%) having private insurance, and (7.8%) have other type of insurance, as (5.2.9) graph shows:



Graph 5.2.9: Represents the frequencies of health insurance type.

5.2.10: Health insurance coverage of glaucoma checkup and treatments:

Glaucoma patients didn't get coverage for their routine checkup, nor their lifelong treatments with a percent (52.0%), while (16.8%) get coverage around 50% of the total cost, (17.2%) of glaucoma patients get coverage around 25% of the total cost, only (5.1%) of patients get coverage around 75% of the total cost, while (9%) of patients didn't know if their insurance cover their routine checkup or their treatments, as (5.2.10) graph shows:



Graph 5.2.10: Represent The frequencies of the family insurance coverage for the cost of glaucoma checkup and treatments.

5.2.11: Number of eye glaucoma medication prescribed:

(40.6%) of glaucoma patients were using two types of glaucoma treatments (eye drop) daily, while (36.3%) were using three types of glaucoma treatments daily, and the rest (23.1%) were using one type of glaucoma treatments daily, as (5.2.11) table shows:

Table 5.2.11: Represent the frequencies of glaucoma medication number prescribed for the participants.

Number of eye glaucoma treatment (eye drop)		Frequency	Percent
	One type daily	74	23.1%
	Two types daily	130	40.6%
	Three types and more daily	116	36.3%
	Total	320	100.0%

5.2.12: Frequency of using eye drops per day:

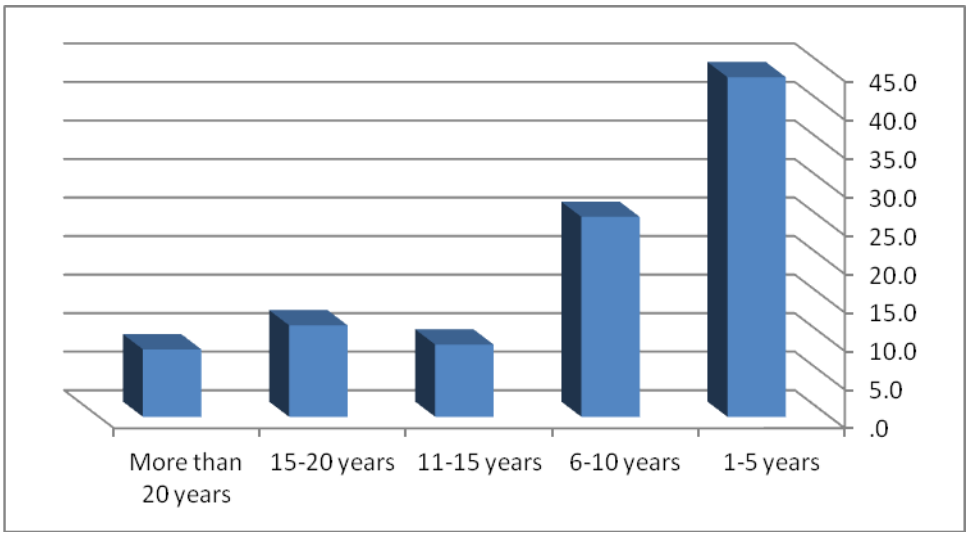
(49.0%) of the participant were using their glaucoma treatments two times a day, while (37.9%) were using their glaucoma treatments three times daily, and (13.1%) were using their treatments once a day, as (5.2.12) table shows:

Table 5.2.12: Represent the frequencies of using eye drops per day by glaucoma patients:

Frequency of using eye drops per day		Frequency	Percent
	Once a day	42	13.1%
	Two times a day	157	49.1%
	Three times a day	121	37.8%
	Total	320	100.0%

5.2.13: Duration of glaucoma disease:

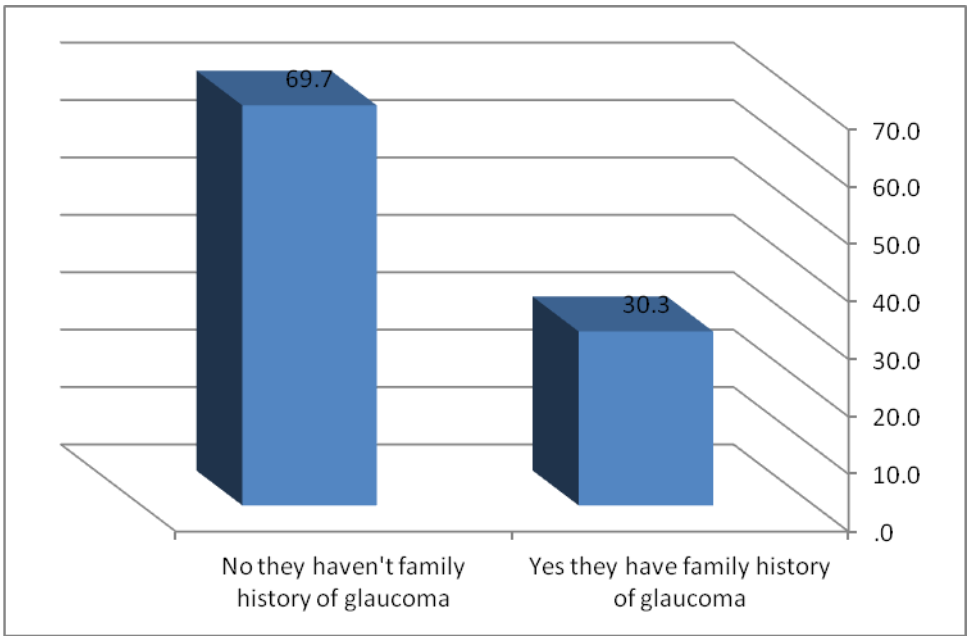
As shown in the table (5.2.13) highest percent of the participants (44.1%) had the disease from 1-5 years, (25.9%) had the disease from 6-10 years, and the lowest frequency was (8.8%) of the respondent had the disease for more than 20 year.



Graph 5.2.13: Represent the frequencies of glaucoma disease duration for the sample.

5.2.14: Family History of Glaucoma:

Related to family history of glaucoma (69.7%) of the respondents didn't have any family history of glaucoma, and 30.3% had positive family history of glaucoma, as (5.2.14) graph shows:



Graph 5.2.14: Represent the frequencies of the family history of glaucoma.

5.2.15: Systemic comorbidity such as hypertension, diabetes, and ischemic heart disease:

Around half of the participants had other systematic disease beside glaucoma with a percent of (55.0%), and (45%) just had glaucoma disease only, as (5.2.15) table shows:

Table 5.2.15: Represent the frequencies of systemic comorbidity such as hypertension, diabetes, and ischemic heart disease for the respondents.

Systemic comorbidity		Frequency	Percent
	Yes	176	55.0%
	No	144	45.0%
	Total	320	100.0%

5.2.16: Transportation and access between the place of residence and SJEHG:

Table (5.2.16), shows that the majority of the respondents had transportation to SJEHG (85.4%), and only (14.6%) didn't have transportation to SJEHG, despite that glaucoma patients suffer from political condition closure of roads and difficulties to reach Jerusalem due to occupation and they have to cross check points to access their outpatient clinic.

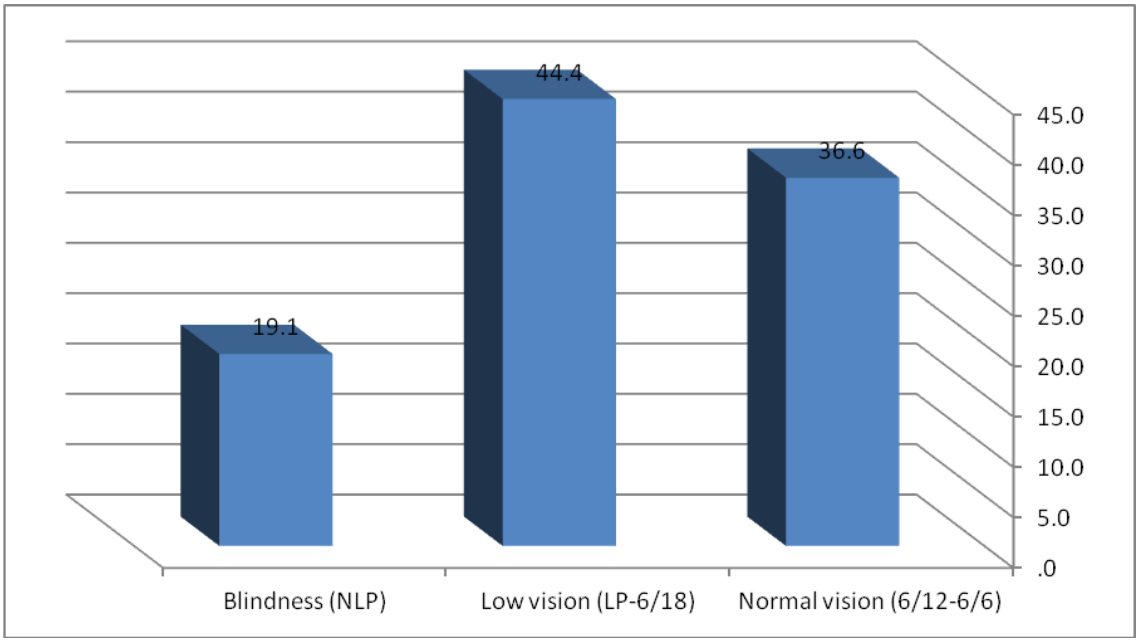
Table 5.2.16: Represent the frequencies of transportation and access available between the place of residence and SJEHG.

Transportation		Frequency	Percent
Valid	Yes	275	85.9%
	No	45	14.1%
	Total	320	100.0%

5.2.17: Glaucoma patients visual acuity:

Graph (5.2.17) illustrates that around half of the participants 54.7% have low vision which defined as the (best-corrected visual acuity less than 6/18 in the better-seeing eye

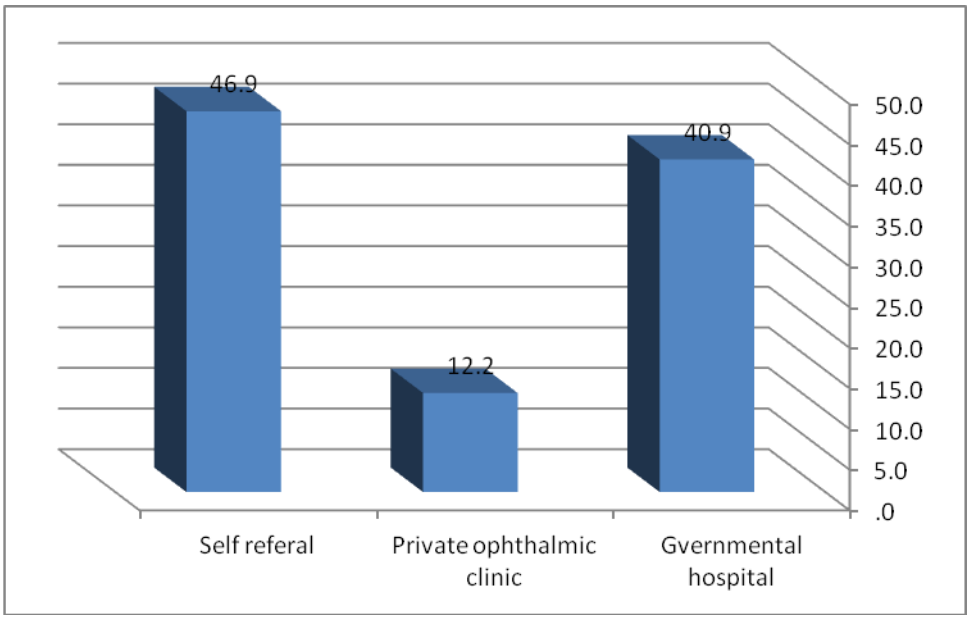
to light perception, while blindness (complete lack of light perception, and is recorded as "NLP," an abbreviation for "no light perception) according to (WHO) was 30.6%, and 24.1% respectively. While 45.3% of the sample has vision near to normal, (6/12 to 6/6).



Graph 5.2.17: Represent the frequencies of visual acuity of the participants (glaucoma patients).

5.2.18: Whose refer glaucoma patients to SJEHG:

The majority of glaucoma patients discover their disease by chance while they came to check their vision self referred (46.9%), and (40.9%) referred from governmental hospital, (12.2%) referred from private ophthalmic physician, as (5.2.18) graph shows:



Graph 5.2.18: Represent the frequencies of the distribution of Whose refer glaucoma patients to SJEHG.

5.2.19: Two most recent intra-ocular pressure results:

Table (5.2.19), shows that the mean for two most recent intra-ocular pressure results (Right Eye) previous visit for glaucoma patients sample was (20.6), while the two most recent intra-ocular pressure results (Right Eye) current visit was (17.77). And related to the two most recent intra-ocular pressure results (Left Eye) previous visit was (19.15), and the two most recent intra-ocular pressure results (Left Eye) current visit was (19.63).

Table 5.2.19: Represent the mean and standard deviation for the two most recent intra-ocular pressure results for the sample of glaucoma patients:

Descriptive Statistics		
Two most recent intra-ocular pressure (IOP) results	Mean	Std. Deviation
Two most recent intra-ocular pressure results (Right Eye) Previous visit	20.63	8.60
Two most recent intra-ocular pressure results (Left Eye) Previous visit	19.15	7.81
Two most recent intra-ocular pressure results (Left Eye)Current visit	19.63	8.32
Two most recent intra-ocular pressure results (Right Eye) Current visit	17.77	7.83

5.3: Compliance level:

Table (5.3) shows, that the majority of the respondents (71.6%) were noncompliant, while only (28.4%) of the sample was compliant.

Table 5.3: Compliance level to topical anti-glaucoma treatments for the respondents.

Total Compliance Level			
		Frequency	Percent
	Noncompliant	229	71.6%
	Compliant	91	28.4%
	Total	320	100.0%

5.3.1: Self reported compliance level:

Based on answers of statements (44.45), and using same cut point I measured the compliance level of the participant, and I found that they exaggerated their compliance level as table (5.3.1) shows, that noncompliance level was 41.9% compared to the total predicted noncompliance level 71.6%, which mean that we can't only rely on self reported to evaluate compliance level, because patients usually underestimated their noncompliance level.

Table 5.3.1: Represent self report compliance level:

Self reported of compliance level			
		Frequency	Percent
	Noncompliant	134	41.9%
	Compliant	186	58.1%
	Total	320	100.0%

5.4.1: Participants' Knowledge about glaucoma:

5-point Likert scale used to measure Knowledge about glaucoma, entered data were coded as followed:

1. Strongly disagree
2. Disagree
3.Dont know
4. Agree
5. Strongly agree

Then after analysis those respondents with mean (1-1.80) considered as strongly disagree, and those with mean (1.81–2.60 disagree), (2.61–3.40) moderate, (3.41–4.20) agree, (4.21–5.00) strongly agree.

By calculating the mean and standard deviation for the sample of glaucoma patients response toward their knowledge about glaucoma, table (5.4.1) shows that the total agreement level related to their knowledge about glaucoma disease was moderate with a mean (M=3.25). The statement that have the highest mean (M=3.81) was "Vision lost from glaucoma is permanent", that mean 76.2% of the participants know that. Then the statement " The reasons people get glaucoma is not well understood" with a mean (M=3.56), that mean 71.2% of the participants know that. While the statement that had the lowest mean (M=2.73) was " Glaucoma is always genetic" that mean only 48.6% of the participants know that.

Table 5.4.1: Represent the respondents knowledge level related to glaucoma:

	Knowledge	Mean	Percent %	Std	Agreement level with sentence
8	Vision lost from glaucoma is permanent.	3.81	76.2	0.84	Agree
12	The reasons people get glaucoma are not well understood.	3.56	71.2	0.78	Agree
10	Glaucoma can be caused by an eye injury.	3.48	69.6	0.88	Agree
5	Being older increases the chances of developing glaucoma.	3.42	68.4	1.08	Agree
4	A person can have glaucoma and not know it.	3.35	67	1.08	Moderate
7	Glaucoma can occur with normal eye pressure.	3.30	66	0.79	Moderate
9	Glaucoma can be caused by diabetes.	3.25	65	0.84	Moderate
2	My personal knowledge of the symptoms of glaucoma is excellent	3.07	61.4	1.15	Moderate
6	Eye pain is a common symptom of glaucoma.	3.07	61.4	1.25	Moderate
11	Blindness is not a possible result of glaucoma.	2.99	59.8	1.06	Moderate
1	My personal knowledge of the risk factors for glaucoma is excellent	2.94	58.8	1.10	Moderate
3	Glaucoma is always genetic	2.73	54.6	1.02	Moderate
	Total agreement level related to their knowledge about glaucoma disease	3.25	65	.35	Moderate

5.4.2: Participants perception of severity of their disease (glaucoma) and the benefits of using treatments:

In this part the results about opinions and agreement of the glaucoma patient toward their condition related their disease and the benefits of treatment.

Table (5.4.2.1), and table (5.4.2.2) represents glaucoma patient's perception of their disease severity and their opinion related to the benefits of using treatments.

In this study a question about what is the awareness of glaucoma patient's to the severity of their disease (glaucoma)? To answer this question means and standard deviation of items were calculated, as shown in the (5.4.2.1) table:

Table 5.4.2.1: Represent the results of glaucoma patient's perception to the severity of their condition (disease):

	Severity	Mean	Std	Agreement level with sentence
18	All of my vision could be lost due to glaucoma	3.27	1.11	Moderate
19	If I lost the same amount of vision over the next five years as I have over the past five, it would have no effect on my quality of life.	3.10	1.11	Moderate
16	The level of my eye disease is not severe.	2.98	1.16	Moderate
17	I have lost none of my vision due to glaucoma.	2.49	1.07	Moderate
	Total agreement level related to their perception for the level of their disease severity	2.96	.63	Moderate

Total agreement level for the participants related to their perception for the level of their disease severity was moderate with a mean (M=2.96). The statement that have the highest mean (3.27) was "All of my vision could be lost due to glaucoma", that mean 65.4% of the participants know that. Then the statement " If I lost the same amount of vision over the next five years as I have over the past five, it would have no effect on my quality of life" with a mean (M= 3.10)), that mean 62% of the participants know that. While the statement that had the lowest mean (M= 2.49) was "I have lost none of my vision due to glaucoma", that mean only 49.8% of the participants know that.

Table (5.4.2.2) shows the participants total agreement level related to their perception for the benefits of using treatments with a mean (M=3.31). The statement that had the highest mean (M=3.47) was " Major vision loss from glaucoma can be prevented with treatment", that mean 69.4% of the participants know that. Then the statement "Eye drop medication can totally control the negative progress of my glaucoma" with mean (M=3.32), that mean 66.4% of the participants know that. While the statement that had the lowest mean (M=3.14) was " I don't think I will go blind in 10 years if I do use my eye drops", that mean 62.8% of the participants know that.

Table 5.4.2.2: Represents the perception of the respondents (glaucoma patients) of the benefits of using glaucoma treatment:

	Benefits	Mean	Std	Agreement level with sentence
13	Major vision loss from glaucoma can be prevented with treatment.	3.47	0.89	Agree
15	Eye drop medication can totally control the negative progress of my glaucoma.	3.32	1.12	Moderate
14	I don't think I will go blind in 10 years if I DO use my eye drops	3.14	1.09	Moderate
	Total agreement level related to their perception for the benefits of using treatments	3.31	.71	moderate

5.4.3: Participants Susceptibility:

Table (5.4.3), shows the participants total agreement level related to their perception for the susceptibility to get glaucoma with a mean (M=3.21). The statement that had the highest mean (M=3.75) was " I need to take drops", that mean 75% of the participants know that. Then the statement" I think I will go blind in 5 years if I do not use my eye drops" with mean (M=3.68), that mean 73.6% of the participants know that. While the statement that had the lowest mean (M=2.53) was " I was not surprised to have gotten glaucoma ", that mean 50.6% of the participants know that.

Table 5.4.3: Represents the Participants perception of the Susceptibility to get the disease (glaucoma):

	Susceptibility	Mean	Std	Agreement level with sentence
25	I need to take drops.	3.75	1.10	Agree
20	I think I will go blind in 5 years if I DO NOT use my eye drops.	3.68	1.09	Agree
23	I am more susceptible to blindness than other people my age.	3.36	1.09	Moderate
21	I think I will go blind in 10 years if I DO NOT use my eye drops	3.33	1.01	Moderate
24	I think I will develop other potentially blinding eye diseases.	2.92	.95	Moderate
22	I was not surprised to have gotten glaucoma.	2.53	1.18	Moderate
	Total agreement level related to their perception for the susceptibility to get glaucoma	3.26	.45	Moderate

5.4.4: Barrier to compliance with glaucoma treatments:

What are a barriers to compliance with treatment? To answer this question means and standard deviation of items were calculated and showed that the total agreement level of the participant related to their perception of treatments barriers was moderate with a mean (M=3.11).

The statement that had the highest mean and moderate agreement was "Sometimes the drops aren't with me when it is time to take them "with mean (M=3.34), that mean 66.8% of the participants know that. Then the statement" Sometimes I forget to use my drops " with mean (M=3.26), that mean 65.2% of the participants know that. While the statement that had the lowest mean (M=2.76) was " I suffer from side effects when using my drops ", that mean 55.2% of the participants know that.

Table 5.4.4: Represent the barriers to compliance with glaucoma treatment:

	Barriers to compliance	Mean	Std	Agreement level with sentence
28	Sometimes the drops aren't with me when it is time to take them.	3.34	1.34	moderate
26	Sometimes I forget to use my drops.	3.26	1.42	moderate
30	My eye drops are reasonably priced	3.23	1.41	moderate
29	Sometimes the drops are painful or uncomfortable to take.	3.10	1.33	moderate
33	My eye drops cause me no pain or discomfort.	3.08	1.32	moderate
32	Sometimes I am out of drops.	3.05	1.38	moderate
27	Sometimes I fall asleep before dosing time	3.02	1.43	moderate
31	I suffer from side effects when using my drops.	2.76	1.34	moderate
	Total agreement level related to their perception of treatments barriers	3.11	.77	moderate

5.4.5: Self-efficacy of the respondents to compliance with glaucoma treatments:

Table (5.4.5), represents the participants total agreement level related to their perception of self-efficacy with a mean (M=2.99). The statement that had the highest mean(M=3.11) was "There are things I can do to prevent my glaucoma from getting worse", that mean 62.2% of the participants know that. Then the statement " There are things I can do to control my glaucoma" with mean (M=3.00), that mean 60% of the participants know that. While the statement that had the lowest mean (M=2.99) was " I can place the eye drops into my eye correctly without any assistance ", that mean 59.8% of the participants know that.

Table 5.4.5: Represent the participant (glaucoma patients) self efficacy

Self-efficacy		Mean	Std	Agreement level with sentence
40	There are things I can do to prevent my glaucoma from getting worse.	3.11	1.09	Moderate
39	There are things I can do to control my glaucoma.	3.00	.97	Moderate
36	My eye drops are difficult to use.	2.75	1.34	Moderate
38	I will always use my eye drops every day.	3.33	1.20	Moderate
35	I need assistance putting drops in my eyes.	2.98	1.29	Moderate
34	I have a great deal of difficulty putting in my eye drops.	2.78	1.31	Moderate
37	I can place the eye drops into my eye correctly without any assistance.	2.99	1.26	Moderate
	Total agreement level related to their perception of the self-efficacy	2.99	.62	Moderate

5.4.6: Perception of the Cause-to-action to compliance with glaucoma treatments:

The respondents total agreement level related to their perception of cues-to-action was moderate with a mean (M=2.95). The statement that had the highest mean (M=3.10) was "A friend or family member's experience with eye drops has encouraged me to use my eye drop", that mean 62% of the participants know that. Then the statement "I use reminders to help me remember to take my eye drop medications" with mean (M=2.79), that mean 55.8% of the participants know that. As table (5.4.6) shows.

Table 5.4.6: Represent results of Cause-to-action to compliance with glaucoma treatments :

	Cues-to- action	Mean	Std	Agreement level with sentence
42	A friend or family member's experience with eye drops has encouraged me to use my eye drops.	3.10	1.24	Moderate
41	I use reminders to help me remember to take my eye drop medications.	2.79	1.18	Moderate
	Total agreement level related to their perception of cues-to-action	2.95	.97	Moderate

5.4.7: Self report of compliance with glaucoma treatments:

Table (5.4.7), represents the participants Total agreement level related to their perception of Self-report of compliance with a mean (M=3.52). The statement that had the highest mean (M=3.58) was "Do you use your eye drops daily", that mean 70.4% of the participants know that. Then the statement " Over the last month I have not missed taking my eye drops" with mean (M= 3.45), that mean 69% of the participants know that.

Table 5.4.7: Represents results of Self report of compliance with glaucoma treatments:

	Self-report	mean	Std	Agreement level with sentence
43	Do you use your eye drops daily	3.58	1.20	Agree
44	Over the last month I have not missed taking my eye drops	3.45	1.24	Agree
	Total agreement level related to their perception of Self-report	3.52	1.11	Agree

5.4.8: Patients physician relationship:

what is the Patient –physician relationship? To answer this question means and standard deviation of items were calculated. As table (5.4.8) shows that the participants total agreement level related to their perception of patient-physician relationship with a mean (M=3.32). The statement that had the highest mean (M=3.76) was" I completely agree with my doctor's diagnosis of glaucoma in my eye(s). ", that mean 75.2% of the participants know that. Then the statement" I am happy with the care I get from my eye doctor(explain every things about the disease, it's treatments ,and the best way to use eye drops) " with mean (M=3.70), that mean 74% of the participants know that. While the statement that had the lowest mean (M=2.51) was " My doctor does not listen to me ", that mean 50.2 % of the participants know that.

Table 5.4.8: Represent results of patients physician relationship:

	Related to patient-physician relationship	Mean	Std	Agreement level with sentence
45	I completely agree with my doctor's diagnosis of glaucoma in my eye(s).	3.76	1.04	Agree
47	I am happy with the care I get from my eye doctor(explain every things about the disease, it's treatments ,and the best way to use eye drops)	3.70	1.14	Agree
46	My doctor does not listen to me.	2.51	1.29	Moderate
	Total agreement level related to their perception of patient-physician relationship	3.32	.49	Moderate

5.4.9: Differences between the level of knowledge about glaucoma, and the demographic characteristics:

To show if there is a relation between the level of glaucoma patient's knowledge and demographic variables, a hypothesis stated that:

There are significant differences at level of significant $\alpha \leq 0.05$ in the degree of knowledge level, and demographic variables, (age, address, marital status, educational level, occupation, income, health insurance).

To examine the hypothesis one way ANOVA test done to compare means of the degree of knowledge level and demographic variables (age, address, marital status, educational level, occupation, income, health insurance). As shown in (5.4.9) table.

Table 5.4.9: Represents the results of knowledge about glaucoma, and the demographic variable:

Variable	Group	Mean	Std	F value	Sig.
Age group	20-30	3.22	0.34	.270	.929
	31-40	3.29	0.41		
	41-50	3.26	0.30		
	51-60	3.22	0.38		
	61-70	3.26	0.32		
	71-80	3.23	0.36		
A dress	City	3.26	.38	.255	.775
	Rural area	3.23	.31		
	Camp	3.24	.37		
Marital status	Single	3.24	.35	.686	.561
	Married	3.26	.37		
	Divorced	3.13	.34		
	Widowed	3.26	.30		
Educational level	Illiterate	3.20	.33	2.003	.078
	Primary School	3.19	.31		
	Secondary School	3.23	.42		
	Diploma	3.30	.31		
	BA degree	3.33	.35		
	Master degree	3.45	.26		

Work status	Employed /labor	3.22	.39	1.140	.338
	Retired	3.18	.34		
	House wives	3.32	.35		
	Unemployed	3.24	.31		
	Other	3.24	.39		
Income	1500-2499 NIS	3.22	.38	.994	.411
	2500-3499NIS	3.28	.35		
	3500-4499NIS	3.21	.31		
	4500-5499NIS	3.36	.32		
	5500 and more	3.22	.34		
Health insurance	Yes	3.25	.35	.001	.979
	No	3.25	.38		

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of knowledge level and demographic variables (age, address, marital status, occupation, income, health insurance) as shown in (5.4.9) table.

5.4.10: Relationships between compliance and (dropper difficulties, physical inability, and side effects of topical treatment:

To study if there is a relationship between compliance level and dropper difficulties, physical inability, and side effects of topical treatment, a hypothesis stated that:

There is significant correlation at level of significant $\alpha \leq 0.05$ in the degree of compliance with the dropper difficulties, physical inability, and side effects of medication.

To test the hypothesis Pearson correlation coefficient was calculated in (5.4.10) table.

Table 5.4.10: Represent the results of Pearson correlation coefficient:

		dropper difficulties, physical inability, and side effects of medication
Degree of Compliance	Pearson Correlation	.505
	Sig. (2-tailed)	.000
	N	320

The result shows that there was a positive significant correlation at level of significant α ≤ 0. 05 in the degree of compliance with dropper difficulties, physical inability of glaucoma patients, and side effects with (Pearson Correlation 0.505).

5.4.11: Relationships between compliance and medication numbers and frequency of using drops:

To study if there was a relationship between compliance and medication numbers and frequency of using drops, a hypothesis stated that:

There are significant differences at level of significant α ≤ 0. 05 in the degree of compliance with anti-glaucoma medication with respect to medication numbers and frequency of drops.

To examine the hypothesis chi-square test used to test the relation of compliance and medication numbers and frequency of using drops as show in (5.4.11) table.

Table 5.4.11: Results of Chi-Square Test for Significance of medication number and frequency of using eye drops on compliance.

		Compliance group						
		Noncompliance		compliance				
		No.	Percent	No	Percent	Chi-square	Sig.	sig. or not sig.
Number of eye glaucoma medications prescribed	One	59	18%	15	5%	6.903	.032	sig.
	Two	83	26%	47	15%			
	three and more	87	27%	29	9%			
Frequency of using eye drops	One	34	11%	8	3%	5.746	.057	not sig.
	Two	103	32%	54	17%			
	three and more	92	29%	29	9%			

There was significant correlation at the level of significant α ≤ 0.05 between compliance and number of eye glaucoma medication prescribed where increase number of eye

glaucoma medication prescribed increase the noncompliance level. While the frequency of using eye drops had no significant correlation with treatment compliance level.

5.4.12: Relationships between compliance and having medical insurance:

To test if there is a relationship between compliance and having medical insurance, hypothesis stated that:

There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to having medical insurance.

To examine the hypothesis chi-square test used to test the relation between degree of compliance and barriers that glaucoma patients faced related to having medical insurance as shown in (5.4.12) table.

Table 5.4.12: Represents the results of chi-square test related to Relationships between compliance and medical insurance:

		Compliance group						
		Noncompliance		compliance				
		No.	Percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
Is there health insurance for the family	Yes	182	57%	74	23%	.138	.710	not sig.
	No	47	15%	17	5%			
What is the type of the insurance	Public insurance	96	38%	41	16%	.766	.858	not sig.
	Private insurance	26	10%	12	5%			
	UNRWA insurance	46	18%	15	6%			
	Other	14	5%	6	2%			
Does family insurance cover the cost of glaucoma checkup and treatments?	High percentage around 75% of the total cost	7	2%	6	2%	2.521	.536	not sig.
	Moderate percentage around 50% of the total cost	31	12%	12	5%			
	Low percentage around 25% of total the cost	29	11%	15	6%			
	Doesn't cover	93	36%	40	16%			
	I don't know	17	7%	6	2%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to having medical insurance, because their insurance didn't cover the cost of follow up and treatment.

5.4.13: Compliance degree with respect to age and gender:

To see if there is a differences in the degree of compliance with respect to age and gender, a hypothesis stated that:

There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to age and gender.

To examine the hypothesis chi-square test used to test the relation between the degree of compliance with topical glaucoma treatment with respect to age and gender. As shown in table (5.4.13).

Table 5.4.13: Chi-square test results of compliance degree with respect to age and gender:

		Compliance group						
		Noncompliance		Compliance				
		No.	Percent	No.	percent	Chi-square	Sig.	sig. or not sig.
Gender	Male	131	41%	47	15%	.815	.367	not sig.
	Female	98	31%	44	14%			
Age group	20-30	31	10%	10	3%	2.605	.761	not sig.
	31-40	33	10%	17	5%			
	41-50	33	10%	14	4%			
	51-60	43	13%	21	7%			
	61-70	56	18%	18	6%			
	71-80	33	10%	11	3%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to age and gender.

5.4.14: Compliance degree with respect to their address:

To see if there is a differences in the degree of compliance with respect to their address, a hypothesis stated that:

There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their address.

To examine the hypothesis chi-square test used to test the relation between degree of compliance with topical glaucoma treatment with respect to their address. As shown in (5.4.14) table.

Table 5.4.14: Represent results of compliance degree with respect to address:

		Compliance group						
		noncompliance		Compliance				
		No.	percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
Address \ location	City	89	28%	35	11%	.064	.969	not sig.
	Rural area	95	30%	39	12%			
	Camp	45	14%	17	5%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their address.

5.4.15: Compliance degree with respect to their marital status:

To see if there is a differences in the degree of compliance with respect to Their marital status, a hypothesis stated that:

There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their marital status.

To examine the hypothesis chi-square test used to test the relation between degree of compliance with topical glaucoma treatment with respect to marital status as shown in (5.4.15) table.

Table 5.4.15: Represent the results of compliance degree with respect to marital status:

		Compliance group						
		noncompliance		Compliance				
		No.	Percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
Marital status	Single	39	12%	12	4%	3.288	.349	not sig.
	Married	130	41%	64	20%			
	Divorced	11	3%	7	2%			
	Widowed	43	13%	14	4%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their marital status.

5.4.16: Compliance degree with respect to their educational level:

To see if there is a differences in the degree of compliance with respect to their educational level, a hypothesis stated that:

There is significant differences at level of significant $\alpha \leq 0.05$ in degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their educational level

To examine the hypothesis chi-square test used to test the relation between the degree of compliance with topical glaucoma treatment with respect to their educational level. as shown in the (5.4.16) table.

Table 5.4.16: Represent the Compliance degree with respect to their educational level:

		Compliance group						
		noncompliance		Compliance				
		No.	percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
Educational level	Illiterate	28	9%	9	3%	6.260	.100	not sig.
	Primary School	74	23%	22	7%			
	Secondary School	58	18%	19	6%			
	After School Education (Diploma, BA, and Master degree)	67	21%	43	13%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their educational level.

5.4.17: Relationships between compliance and level of glaucoma patient vision:

There is significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their level of vision.

To examine the hypothesis chi-square test used to test the relation between degree of compliance with topical glaucoma treatment with respect to their vision, as shown in table (5.4.17).

Table 5.4.17: Represent the results of compliance degree with respect to their vision:

		Compliance group						
		Noncompliance		Compliance				
		No.	Percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
vision group	Normal	100	31%	45	14%	2.927	.231	not sig.
	low vision	68	21%	30	9%			
	Blindness	61	19%	16	5%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to their level of vision.

5.4.18: Relation of other independent variables on compliance:

To see the relation of past glaucoma family history, systemic co morbidity such as hypertension, diabetes, and ischemic heart disease, whose refer glaucoma patient to SJEHG, duration of the disease, availability of transportation to SJEHG, work status, and household income I used Chi-square test to test the dependence of compliance and these variables as shown in table (5.4.18).

Table 5.4.18: Represent the results of Chi-square test about relation between compliance and family history, comorbidity, referral physician, date of diagnosing, availability of transportation to SJEHG, work status, and household income as independent variables:

		Compliance group						
		Noncompliance		Compliance				
		No.	Percent	No.	Percent	Chi-square	Sig.	sig. or not sig.
Is there past family history of glaucoma?	Yes	65	20%	32	10%	1.417	.234	not sig.
	No	164	51%	59	18%			
Do you have any systemic comorbidity such as hypertension, diabetes, and ischemic heart disease?	Yes	128	40%	48	15%	.261	.610	not sig.
	No	101	32%	43	13%			
	No	38	12%	7	2%			
Whose refer you to SJEHG ?	Governmental Hospital	86	27%	45	14%	6.734	0.034	Sig.
	Private Ophthalmic Clinic	24	8%	5	2%			
	Self Referral	103	32%	47	15%			
Date first diagnosed in years	one to five	105	33%	36	11%	1.786	.775	not sig.
	six to ten	59	18%	24	8%			
	eleven to fifteen	19	6%	11	3%			
	sixteen to twenty	27	8%	11	3%			
	more than 20	19	6%	9	3%			
Is transportation and access available between the place of residence and SJEHG which offers follow up for glaucoma patients?	Yes	191	60%	84	26%	4.270	.039	Sig
	No	38	12%	7	2%			
Household Income	2500-3499NIS	76	24%	20	6%	7.807	.099	not sig.
	3500-4499NIS	81	25%	43	13%			
	4500-5499NIS	38	12%	11	3%			
	5500 and more	9	3%	7	2%			
	5500 and more	25	8%	10	3%			

Work status	Employed /labor	68	21%	37	12%	6.442	.169	not sig.
	Retired	21	7%	6	2%			
	House wives	48	15%	25	8%			
	Unemployed	81	25%	21	7%			
	Other	7	2%	6	2%			

There was no significant differences at level of significant $\alpha \leq 0.05$ in the degree of barriers that glaucoma patients faced when compliance to topical glaucoma with respect to past family history of glaucoma, systemic co-morbidity such as hypertension, diabetes, and ischemic heart disease, duration of the disease, work status, and household income.

While transportation, and whose refer glaucoma patient to SJEHG, had significant effect on compliance to topical anti-glaucoma treatments as shown in previous table (5.4.18), with (P value=0.039) and (P value=0.034) respectively.

5.4.19: Relation between degree of compliance and two most recent intra-ocular pressure:

To see if there is a relation between degree of compliance and two most recent intra-ocular pressure, a hypothesis stated that:

There is significant correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and Two most recent intra-ocular pressure results (Right Eye, Left Eye) Previous visit and Current visit.

To test the hypothesis Pearson Correlation Coefficient calculated in table (5.4.19).

Table 5.4.19: Represent the results of person correlation test about the relation of two most recent intra-ocular pressure and degree of compliance.

Correlations						
		Total	Right Eye (Previous visit)	Left Eye (Previous visit)	Right Eye (Current visit)	Left Eye (Current visit)
compliance	Pearson Correlation	1	.067	-.003	-.012	-.009
	Sig. (2-tailed)		.233	.959	.828	.874
	N	320	320	318	319	320

There was no significant correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and two most recent intra-ocular pressure results (Right Eye, Left Eye) Previous visit and Current visit related to study time.

5.5.1: Relationship between the independent variables as categories and degree of compliance:

In this section I tried to find which one of the independent variables (perception of knowledge about glaucoma, perception of benefits, perception of severity, perception of susceptibility, perception of barriers, perception of self efficacy, perception of cause to action, perception of self report compliance, perception of patients physician relationship) had the most significant effects on the degree of compliance, a hypothesis stated that:

There is no significant correlation at the level of significance $\alpha \leq 0.05$ between degree of compliance and factors (knowledge, benefits, severity, susceptibility, barriers, self-efficacy, cues-to-action, self-report, patient-physician relationship.

To test the hypothesis the" Multiple Linear Regression" used to fined orders of the factors related to their affect on the degree of compliance (stepwise regression used) as shown in table (5.5.1). The most significant factors affect the degree of compliance were knowledge, then self efficacy, then treatment barriers, then susceptibility, then self report ,then disease severity, then benefits of using treatments, then cues to action, finally patient physician relationship.

Table 5.5.1: Represent the relationship between the independent variables (perception of knowledge about glaucoma, perception of benefits, perception of severity, perception of susceptibility, perception of barriers, perception of self efficacy, perception of cause to action, perception of self report compliance, perception of patients physician relationship) and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.642[a]	.413	.411	.18991
	2	.839[b]	.704	.702	.13493
	3	.885[c]	.782	.780	.11595
	4	.915[d]	.838	.836	.10022
	5	.942[e]	.888	.886	.08353
	6	.970[f]	.940	.939	.06093
	7	.982[g]	.965	.964	.04698
	8	.993[h]	.986	.986	.02920
	9	1.000[i]	1.000	1.000	.00000

a. Predictors: (Constant), knowledge
b. Predictors: (Constant), knowledge, self efficacy
c. Predictors: (Constant), knowledge, self efficacy, barriers
d. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility
e. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility, self report
f. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility, self report, severity
g. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility, self report, severity, benefits
h. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility, self report, severity, benefits, cues to action
i. Predictors: (Constant), knowledge, self efficacy, barriers, susceptibility, self report, severity, benefits, cues to action, patient physician

5.5.2: Relationships between the independent variables knowledge and degree of compliance:

To examine which variable of knowledge has the most effects on compliance,

a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of (knowledge).

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used), as shown in table (5.5.2), the most factors affect the degree of compliance were: being older increases the chances of developing glaucoma, then glaucoma can be caused by an eye injury increase the chances of developing glaucoma.

Table 5.5.2: Represent the most important variable of knowledge affect the degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.465[a]	.216	.213	.21940
	2	.529[b]	.279	.275	.21064
	3	.585[c]	.342	.336	.20165
	4	.609[d]	.370	.362	.19754
	5	.635[e]	.403	.393	.19272
	6	.661[f]	.437	.426	.18736
	7	.676[g]	.457	.445	.18436
	8	.691[h]	.477	.464	.18111
	9	.703[i]	.494	.479	.17854
	10	.708[j]	.501	.485	.17758
	11	.713[k]	.508	.491	.17657

a. Predictors: (Constant), a5
b. Predictors: (Constant), a5, a10
c. Predictors: (Constant), a5, a10, a3
d. Predictors: (Constant), a5, a10, a3, a2
e. Predictors: (Constant), a5, a10, a3, a2, a6
f. Predictors: (Constant), a5, a10, a3, a2, a6, a12
g. Predictors: (Constant), a5, a10, a3, a2, a6, a12, a4
h. Predictors: (Constant), a5, a10, a3, a2, a6, a12, a4, a11
i. Predictors: (Constant), a5, a10, a3, a2, a6, a12, a4, a11, a7
j. Predictors: (Constant), a5, a10, a3, a2, a6, a12, a4, a11, a7, a1
k. Predictors: (Constant), a5, a10, a3, a2, a6, a12, a4, a11, a7, a1, a9

5.5.3: Relationships between the independent variables benefit of treatments and degree of compliance:

To examine which variable of treatment benefits has the most affects on compliance, a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of (benefits).

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in table (5.5.3), factor that had the most affects on the degree of compliance was: major vision loss from glaucoma can be prevented with treatment.

Table 5.5.3: Represent the results of treatment benefits and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.214[a]	.046	.043	.24291
a. Predictors: (Constant), a13					

5.5.4: Relationships between the independent variable glaucoma severity and degree of compliance:

To examine which variable of glaucoma severity has the most affects on compliance, a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of (severity).

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in table (5.5.4), the factor that had the most affect on the degree of compliance were: vision lost totally from glaucoma, then the amount of vision lost over the next five years if it will be the same as past five it would not effect on their quality of life.

Table 5.5.4: Represent the results of glaucoma severity and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.253[a]	.064	.061	.23970
	2	.305[b]	.093	.087	.23637
a. Predictors: (Constant), b18					
b. Predictors: (Constant), b18, b19					

5.5.5: Relationships between the independent variables glaucoma susceptibility and degree of compliance:

To examine which variable of susceptibility has the most effect on compliance,
a hypothesis stated that:
There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of (susceptibility).

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in table (5.5.5), the factor that had the most affects on the degree of compliance was their feeling that they are susceptible to blindness more than other people in the same age due to glaucoma disease.

Table 5.5.5: Represent the results of glaucoma susceptibility and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.344[a]	.118	.116	.23262
a. Predictors: (Constant), b23					

5.5.6: Relationships between the independent variable treatment barriers and degree of compliance:

To examine which variable of treatment barriers has the most affects on compliance,
a hypothesis stated that:
There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors treatment barriers.

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used), as shown in table (5.5.6), factors that had the most affect on the degree of compliance were: primarily: was the availability of glaucoma drops with patients at the prescribed the time, secondly factor was the side effects when using their drops, the thirdly factor was the forgetfulness.

Table 5.5.6: Represent the results of glaucoma treatment barriers and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.490[a]	.240	.238	.21594
	2	.570[b]	.325	.321	.20388
	3	.594[c]	.353	.347	.19996
	4	.604[d]	.365	.357	.19835
	5	.614[e]	.377	.367	.19681
	6	.620[f]	.385	.373	.19585
a. Predictors: (Constant), c28					
b. Predictors: (Constant), c28, c31					
c. Predictors: (Constant), c28, c31, c26					
d. Predictors: (Constant), c28, c31, c26, c33					
e. Predictors: (Constant), c28, c31, c26, c33, c29					
f. Predictors: (Constant), c28, c31, c26, c33, c29, c30					

5.5.7: Relationships between the independent variable glaucoma patient self-efficacy and degree of compliance:

To examine which variable of glaucoma patient's self-efficacy has the most affects on compliance, a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of glaucoma patient self-efficacy.

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in table (5.5.7), factors that had the most affect on the degree of compliance were: that glaucoma patients having a great deal of difficulty while putting their eye drops. Then glaucoma patient didn't know that there are things they can do to prevent their disease from getting worse, then the continuity of using eye drop every day need good level of self efficacy to be achieved.

Table 5.5.7: Represent the results of glaucoma patient self efficacy and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
Dimension0	1	.469[a]	.220	.218	.21880
	2	.559[b]	.313	.309	.20570
	3	.584[c]	.341	.334	.20182
	4	.591[d]	.349	.341	.20089
a. Predictors: (Constant), c34					
b. Predictors: (Constant), c34, c40					
c. Predictors: (Constant), c34, c40, c38					
d. Predictors: (Constant), c34, c40, c38, c36					

5.5.8: Relationships between the independent variable cause to action and degree of compliance:

To examine which variable of cues to action has the most affects on compliance we put a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of cues-to-action.

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in (5.5.8) table (5.5.8), factors that had the most affects on the degree of compliance were: using reminders to help glaucoma patients to remember taking their eye drop, then previous experience of the family member's or a friend with eye drops has encouraged them to use their eye drops.

Table 5.5.8: Represent the results of cues to action and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.332[a]	.110	.107	.23371
	2	.356[b]	.127	.121	.23189
a. Predictors: (Constant), d41					
b. Predictors: (Constant), d41, d42					

5.5.9: Relationships between the independent variable self report and degree of compliance:

To examine which variable of self-report has the most effect on compliance,
a hypothesis stated that:
There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors of self-report.

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used), as shown in table (5.5.9), the factor that had the most affects on the degree of compliance was using eye drops daily which mean lifelong treatment.

Table 5.5.9: Represent the results of self report and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.143[a]	.021	.017	.24521
a. Predictors: (Constant), d43					

5.5.10: Relationships between the independent variable patient physician relationship and degree of compliance:

To examine which variable of patient physician relationship has the most affects on compliance, a hypothesis stated that:
There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and factors patient-physician relationship.

To test the hypothesis the "Multiple Linear Regression" used to fined factors that most affect the degree of compliance (stepwise regression used) as shown in (5.5.10) table. Factors that had the most affect on the degree of compliance were: patient acceptance that he/she has glaucoma, then good listening from their doctor.

Table 5.5.10: Represent the results of patient physician relationship and degree of compliance:

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.148[a]	.022	.019	.24503
	2	.279[b]	.078	.072	.23829
a. Predictors: (Constant), e45					
b. Predictors: (Constant), e45, e46					

5.6: Differences between the degree of compliance and variables (personal barriers, treatment barriers, health system barriers, disease barriers):

To examine which barrier has the major affects on patient's compliance level,

a hypothesis stated that:

There is no significant of correlation at the level of significant $\alpha \leq 0.05$ between degree of compliance and other variables (personal barriers, treatment barriers, health system barriers, disease barriers).

To test the hypothesis the Multiple Linear Regression used to fined factors that most affect the degree of compliance (stepwise regression used), as shown in table (5.6.1), The table shows that the personal barriers had the most affects on the degree of compliance since it interpret (20.8%) of variation of compliance, then treatment barriers which interpret (14.2%) of variation in compliance, while the two variables interpret (35%) of variation in the degree of compliance.

Table 5.6.1: Represent the results of correlation between degree of compliance and variables (personal barriers, treatment barriers, health system barriers, disease barriers).

Model Summary					
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate
dimension0	1	.456[a]	.208	.205	.86416
	2	.592[b]	.350	.346	.78357
a. Predictors: (Constant), personal barriers					
b. Predictors: (Constant), personal barriers, treatment barriers					

Also I did coefficients test to determine the type of relation between the degree of compliance and the two barriers which had the most effect on compliance as next table (5.6.2) shows, that there was a positive correlation between degree of compliance and personal barriers, while negative correlation between treatment barriers and degree of compliance.

Table 5.6.2: Represent the relation between the degree of compliance and (personal barrier, treatment barrier):

Coefficients [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.848-	.570		-3.241-	.001
	personal barriers	1.656	.177	.456	9.338	.000
2	(Constant)	-.937-	.528		-1.775-	.077
	personal barriers	2.014	.166	.554	12.118	.000
	treatment barriers	-.653-	.076	-.391-	-8.545-	.000
a. Dependent Variable: compliance						

5.7: Summary of the Results:

The overall predicted noncompliance level was 71.6%. While self reported noncompliance level was only 41.9% which improves that patient usually underestimated their noncompliance level. Noncompliance was found to be higher in males than females (74%) to (69%) respectively. Noncompliance level was higher in those above fifty years. Divorced glaucoma patients had the highest noncompliance level (94%). Retired and unemployed had a noncompliance level (81%) and (79%) respectively. Noncompliance level was high in glaucoma patients who were considered blind (79%).

Compliance was found to be related to the level of education, with the highest noncompliance level was in illiterate (76%). Participants generally had a moderate level of knowledge about their disease, which together with self efficacy affected compliance positively.

Treatment barriers affected compliance negatively. The factors that had the most impact on compliance were, primarily: was the availability of glaucoma drops with patients at the prescribed the time, secondly: the side effect of glaucoma drops, thirdly: forgetfulness.

Despite the majority of Glaucoma patients having insurance they were noncompliant, because their insurance didn't cover the cost of follow up and treatment so they paid out of pocket.

According to number of eye drop and frequency of using it there was significant correlation between compliance and number of eye drops prescribed. While the frequency of using eye drops, had no significant correlation with treatment compliance level.

Family history of glaucoma had no significant relation with compliance level, but patients with positive family history were compliant more than patients without family history of glaucoma (675) and (74%) respectively.

Comorbidity with other systematic disease had no significant relation with compliance level, although it was associated with high level of noncompliance (73%). Related to disease duration the highest noncompliance level was in the first five year of treatments (74%). Transportation had significant affects on noncompliance level (84%) compared (69%). With regard to patient physician relationship it had affects their compliance level positively; effective communication with the health care provider and careful listening beside spending enough time with patients was the effective factors to improve their level of compliance.

Chapter Six:

Discussion, Conclusion, and Recommendations:

This chapter aims to discuss the results of this study of compliance among glaucoma patients who attended SJEHG clinic at Jerusalem, Hebron and Anabta. It also highlights the results related to the purpose of this study.

Conclusions drawn from the results, and recommendations of what need be done in the future to combat noncompliance, as well as recommendation to continue research in this field, will also be illustrated.

6.1: Compliance level of glaucoma patients:

Before start talking about glaucoma noncompliance level and the factors affecting their compliance with topical glaucoma treatment at SJEHG, I need to know these facts related to the context of the study: Israel's continued occupation of the State of Palestine is throwing people into poverty and severely impeding sustainable development. The State of Palestine's delegate stressed that 42% of Palestinians inhabitants are now refugees after 69 years of Israeli occupation. Adding that Israel controlled more than 61 per cent of the West Bank, driving Palestinians from their land and hindering economic activity. The continuing occupation impedes access to resources, opportunities, services and aid, compounding the problems faced by Palestinians from all sectors of society. With high unemployment among men and the loss of family members to prison or death. Beside the Israeli system of checkpoints, roadblocks, and closures, which has separated Palestinians from Israel and Jerusalem and made travel between the West Bank and Gaza Strip nearly impossible. Within the West Bank, there are over 700 kilometers of roadways that Palestinians need a special permit to travel on. Israelis have obstructed roads in hundreds of locations with piles of

boulders, cement blocks or trenches to further inhibit movement, cutting off many towns and villages from direct vehicular access. There are 60 permanently staffed Israeli military checkpoints in the West Bank in addition to "flying" or temporary checkpoints. Palestinians require permits from the Israeli authorities to leave their villages or towns, which are difficult to obtain. In addition, Palestinians do not enjoy independent international borders for trade or travel. Poverty cannot be viewed purely as an economic issue. Not only does poverty have many social impacts, economically, this translates into a lack of access to markets, raw materials, means of production, job opportunities, and labor. The lack of freedom of movement negatively affects access to education, mental and physical health services, People are not seeking medical treatment unless absolutely necessary because of cost and mobility issues. These consequences increase disproportionately for the poor (United Nations Office for the Coordination of Humanitarian Affairs,2014).

Noncompliance with medical therapy has long been recognized as an important limiting factor in the medical management of any chronic disease. Patients with glaucoma who have lower rates of compliance, are presumed to be at greater risk of developing visual loss (Stryker et al., 2010). This study was done to a assess compliance level and the factors affecting compliance to glaucoma medications among sample of Palestinian glaucoma population drown from SJEHG as a developing country under occupation. After analysis, results showed, glaucoma patients in this study, had a high percentage of noncompliance (71.6%), that frames the magnitude of the problem.

The results of this study was corresponded with Olthoff et al., (2005) study that shows noncompliance level (72.7%) in Dutch. And Khandekar et al., (2005) that shows noncompliance rate of 75.2% was reported among Oman glaucoma population in 2005.

While a study was done in Egypt by Abu Hussein et al., (2015) shows that noncompliance with glaucoma medication is (53.6%). Other studies that reported noncompliance level is (55.0–60.0%) in USA (Nordstrom et al., 2005; Sleath et al., 2006; Tsai, 2009; Okeke et al., 2009).

A study by Masoud et al., (2013), shows that noncompliance rates in Western populations and in the rest of Israel vary from 27.4% to 42%.

6.2: Compliance level of glaucoma patients related to level of knowledge and level of education:

After analysis, results showed, that glaucoma patients in this study had a moderate level of knowledge about their disease with a mean (M=3.25), and the high level of knowledge were about permanent vision lost from glaucoma with a mean (M=3.81). On the opposite side glaucoma patients didn't have enough knowledge about glaucoma disease if it is always genetic or not, with a lowest mean (M=2.72).

Knowledge level about glaucoma disease in this study was the important factor affecting their level of compliance positively as multiple linear regression test shows in (table 5.5.1).

This result coincides with Masoud et al., (2013) results about factors associated with nonadherence included inadequate knowledge which get a high percent (32%). Lack of knowledge and misunderstanding were the main factors cited for the >57% noncompliance rates in Arab population in Israel.

This is consistent with Khandekar et al., (2005) study in Oman, that showed better knowledge about glaucoma is associated positively with better compliance rates. The knowledge about glaucoma was reported to be good in 23.8% of patients, who demonstrated higher compliance rates, the study reported that over a third of glaucoma patients failed to use their ophthalmic medications properly, mainly due to lack of knowledge.

Similarly to a study by Yoo, and Hwang (2015) that reported higher knowledge about glaucoma medication was significantly associated with a higher compliance score ($p < 0.05$).

This study didn't find significant association between educational level and noncompliance. Which could reflect that educational level didn't give proper knowledge about disease, which leads them to being noncompliant. The highest noncompliance level was in the illiterate (76%) and the lowest level was with those with master degree (57%). This data is validates other studies like Stryker et al., (2010) done

in Egypt, that shows improving knowledge about glaucoma through education significantly improved compliance.

Compared with Abu Hussein et al., (2015) study which reported that patient with low level of education were associated with poor compliance level.

Similarly, result of Olthoff et al., (2009) study showed that there was no association between non-adherence and level of education.

6.3: Compliance level of glaucoma patients related to age and gender:

Results of this study found noncompliance common among both sexes, A higher rate of noncompliance among males than females (74%) to (69%) respectively.

This result is similar to study conducted by Abu Hussein et al., (2015) in Egypt, which showed males had a tendency for higher noncompliance than females.

This is contrary to Khandekar et al., (2005), study reported that gender per se is not associated with increased noncompliance.
Masoud et al., (2013), did a study among an Arab population in Israel results revealed that general rate of noncompliance, for both genders, was found to be 50%.
Compared to Olthoff et al., (2009) study results done in Dutch patients found that there was no association between non-adherence and sex.
Similarly a study by Yoo, and Hwang (2015) was done in Korea reported that sex was not significant in compliance score.

Glaucoma patients age had insignificant affects on compliance to topical glaucoma treatment. In this study, higher noncompliance level was found in younger and old age groups from (20-30) and (61-70), (76%) for each one. Noncompliance level was higher in those above fifty years, which fits that older patients may have a lower compliance probably due to reduced vision, problems with manual dexterity, coordination, comprehension, or memory; however, this was not evaluated in this study.

This coincides Sleath et al., (2006) study done in USA found that older patients may exhibit poor glaucoma treatment adherence due to difficulty reading prescription labels.

Masoud, et al (2013) study found that compliance was significantly higher in younger patients (age < 50) 63%. Noncompliance was found to be common among an Arab population in Israel, particularly between the ages of 50 and 80.

This is not similar to the study conducted by Tsai, (2009) in USA, that showed older age has not been shown to be a consistent risk factor for poor adherence to glaucoma medication regimens. Risk factors for poor adherence or nonadherence to topical glaucoma medication regimens obstacles are common in the elderly (e.g., reduced cognition, musculoskeletal problems, and transportation difficulties).

Compared with Abu Hussein et al., (2015) study which reported that patient age above 50 years is associated with poor compliance.

6.4: Compliance level of glaucoma patients related to financial coverage (insurance), income, and disease duration:

Another factor that may affect compliance related to this study was financial coverage for the cost from their medical insurance. Analysis of the results showed statistically there is no significant differences of barriers that glaucoma patients faced when compliance to topical anti glaucoma with respect to having medical insurance as 80% of the participant have insurance, because their insurance didn't cover the cost of follow up and treatment and they paid out of pocket, which could have been one of the barriers that lead to lack of IOP control. This can be related to the economic burden of glaucoma medications (eye drops) in Palestine related to their average income level.

This agrees with studies results like, Sleath et al., (2006) ;Tsai (2006) which found that the factors leading to poor compliance were high drug cost. In Egypt a study by Abu Hussein et al., (2015) found that Polytherapy and lack of medical insurance could be contributing factors for noncompliance in glaucoma patients.

Stryker et al., (2010) study that showed patients with low monthly income were less likely to be compliant compared to patients with high monthly income. This finding was related to a previous study that revealed unaffordability considerably affects adherence. Besides this, patients who purchased ocular hypotensive drops by themselves were less likely to be adherent compared to patients who obtained their medications free of charge.

Castel et al., (2014) study was done in Haifa and Western Galilee District showed that barriers to adherence were found to be low income.

This study found that poor compliance was not associated with disease duration, and the highest (74%) level of noncompliance was found in the first five years of using eye drops. A study by Parrish et al., (2009) showed that many patients are in denial about their health problems, especially in asymptomatic diseases such as glaucoma may this explain the high noncompliance level in the first five years of diagnosis.

This agreed with Olthoff et al., (2009) study, that found there is no association between non-adherence and duration of disease. It also agreed with a study by Yoo, and Hwang (2015), which reported that longer duration of treatment was significantly associated with a higher compliance score ($p < 0.05$).

6.5: Compliance level of glaucoma patients related to medication and drop application issues:

This study highlighted the importance of medication numbers as well as the complexity of regimen (frequency of using eye drops) on compliance level among glaucoma patients. It showed a statistically positive correlation between the degree of compliance and dropper difficulties, physical inability, and side effects of medication with (Pearson Correlation 0.505). This agrees with Slota et al., (2015) study in USA result that (45%) of patients expressed a problem related to medication side effects during their medical encounter with their ophthalmologist.

Contrary to Buchan et al., (2007) a study in United Kingdom, found that the frequency of instillation eye drops per day did not affect compliance significantly, although that

study has shown that a single daily drug dose or combination is associated with better compliance rates.

This is consistent with Nordstrom et al., (2005) study in USA results, that showed complexity of taking multiple medications for multiple diseases, change in dosing schedules and side effects of medications are all well known reasons for nonadherence, complicate their medication adherence, if they have no external help. Once-a-day dosing with prostaglandin and beta-blockers have a better persistency.

Similarly to a study by Castel et al., (2014) in Haifa and Western Galilee reported that taking a higher number of drops per day, and taking a prostaglandin drug are considered a barrier to compliance in glaucoma patients due the side effects.

A study by Gupta et al., (2012) in India showed that when the eye drop application techniques were assessed, nine out of ten were unable to instill their eye drops correctly.

While forgetfulness was the number one reported reason for non-compliance in Taylor's (2002) study in USA, in this study, forgetfulness was the third cause of noncompliance related treatment barriers. Consistent to Olthoff et al., (2009) study results found that forgetfulness, unavailability of eye drops and difficulties with holding the bottle above the eye when applying the eye drops, were the most cited reasons for non-adherence, and fifty percent of the patients indicated that they required more information on the correct administration of eye drops

Compared with Stryker et al., (2010) study in USA result, non-adherent participants were more likely to have difficulty remembering to take their medications and to believe their glaucoma would affect their eye sight in the future.

Similarly a study by Yoo, and Hwang (2015) reported that the most common reason for missing medication was forgetfulness (80.5%) related to treatment barriers.

6.6: Compliance level of glaucoma patients related to barriers as categories:

In this study the researcher used four major categories which had effect on compliance level of glaucoma patients (personal related barriers, treatment related barriers, health provider related barriers, and glaucoma related barriers).

This study found that personal related barriers had the most effect on the degree of compliance since it interpret 20.8% of variation of compliance, then treatment related barriers which interpret 14.2% of variation in compliance, and the other categories' didn't have much effect on degree of compliance. This results agreed with Sleath et al., (2006) study that showed non-adherent glaucoma patients are more likely to have impaired visual acuity or partial vision loss which related to personal barrier.

This study found that health provider related barriers affected compliance, in that, glaucoma patients who reported that their ophthalmic doctor had not adequately explained their eye condition, management and risks, were more likely to be noncompliant with using their antiglaucoma medicine.

This is consistent with Taylor et al., (2002) study that showed adherence is better achieved where physician take proactive role in discussing with patient regarding their disease and use of medication. Communication between physicians and patients is a key factor in compliance for glaucoma patients.

Agreed with Kelly et al., (2009) study reported that communication is an important factor over which physicians have some control in helping their patients to adhere. The patient-physician interaction remains a cornerstone in improving compliance rates due to intolerance. Additionally, the physician must be aware of possible side effects and keenly seek them out, while always discussing various treatment options.

The psychometrics of the GTCAT have been studied and modified over the last few years, where now it is generally accepted that this instrument shows excellent repeatability, content, construct, and predictive validity for glaucoma adherence; and is

widely used. Our conclusion concurred that is was a useful and reliable tool, to study compliance in Palestinian patients with glaucoma, and served the objectives of the study effectively.

6.7: Conclusion and Recommendations:

The results of the current study about glaucoma patients treated at SJEHG in three cities (Jerusalem, Hebron, and Anabta), revealed high level of noncompliance among Palestinian glaucoma patients at SJEHG, compared to other studies in developed world. Compliance is mostly a multifactorial problem. Higher level of knowledge and patient self efficacy were the main positive associations with good level of compliance. Poor understanding of the disease may lead to poor compliance. This is a global problem that needs cooperation of physicians, media, and social care providers. Extra effort needs to be done by health care providers since "the personal related barriers were important factors" to educate our patients about the nature of glaucoma, glaucoma susceptibility, importance of treatment, follow-up visits, and effect of treatment on prognosis. Longer time has to be spent with our patients teaching them how to instill their drops. Also, simplifying treatment regimen and tailoring it to their daily routine lifestyle are a must. Reminders of follow-up visits with proper tracking of our patients must be added to our health care system. Patients appeared to need sufficient initial information, long-term education (with feedback), and the establishment of sufficient medication-faith to enable self-management.

Greater adherence leads to better outcomes, finding ways of addressing the major issue of non-adherence is a significant challenge in the care of patients with glaucoma, but one with tremendous potential to make a difference.

- **The following "Recommendations" will help the management of glaucoma and compliance:**

This quantitative analysis and comparison of compliant and noncompliant glaucoma patients related to topical treatment barriers, has implications for healthcare policy as the aging population increases and as treatment adherence potentially becomes an increasingly challenging and costly problem. This research also provides important

information to guide the development of interventions to improve glaucoma treatment adherence.

- ❖ Ophthalmologists should spend more time with patients on medical therapy and repeatedly explain, among other things, the nature and natural history of the disease, the importance of treatment and exactly how they should use their drugs. Also encourage nurses to be involved like offering specialization of glaucoma nurse practitioner.

- ❖ Educating patients about their disease and its complications, using guiding brochures and DVDs, and improving the patient-physician relationship by personalizing the treatment can plausibly improve compliance rates. Furthermore, patients' needs and knowledge should be taken into consideration in order to improve patients' compliances, this is beside using of telephone call as a reminder to enhance their level of compliance.

- ❖ Glaucoma patients could be taught effective application techniques, inducing confidence. Memory aids/cues and the importance of routine could be discussed and administration schedules devised so that effective measures to ensure adherence are in place at commencement of treatment.

- ❖ Health education campaigns concerning glaucoma should be delivered through the mediums of radio, television, posters, and pamphlets. It is necessary to target patients and the community at large, especially family and friends of glaucoma patients. The health education massage could be conveyed by people who developed complication as results of non-compliance.

- ❖ Government should provide free or highly subsidized drugs for those of them that cannot afford to buy their drugs or pay for filtration surgery.

- ❖ Future research should focus on assessing the value of health behavior models in improving glaucoma medication compliance. The prevalence rate of glaucoma and it complications, such a survey would provide useful information for policy makers to evaluate medical situation and economic implications with

cooperation of focus group in order to help in the formulation of policies related this topic. Also we need more qualitative research to obtain more detailed information about factors that could improve compliance.

6.8: Limitations:

The following limitations should be considered when interpreting the results of the present study.

We limited respondents to those between 20 and 80 years of age. Our sample was not representative of all glaucoma patients. Our sample was drawn from SJEHG. This was a representative sample from glaucoma specialty care clinics in the SJEHG in three cities, and the results may not be representative of patients followed in comprehensive ophthalmology clinics elsewhere. Though all patients in the waiting room of the glaucoma clinics were approached and asked to complete a survey about how they use their glaucoma medications.

The other difficulties I faced were the lack of a national register or database on glaucoma patients in Palestine and the dearth of studies on this topic, both regionally and in the Palestinian territories; there was some limited data on Arab Israelis.

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Annex A: A letter of permission from SJEHG.

ST. JOHN EYE HOSPITAL
Research Ethical Approval Form

Research Title: compliance with glaucoma medications amongst patients suffering from Glaucoma at St. John Eye Hospital.

Investigators: Khitam Hassanat, Staff Nurse and MPH STUDENT.

Has the research proposal identified any of the following research procedures?

1. Gathering information from or/and about human beings through: Interviewing, Surveying, questionnaires, Observation of human behaviour.
2. Using archived data in which individuals are identifiable.
3. Researching into illegal activities, activities at the margins of the law or activities that have a risk of personal injury.
4. Supporting innovation that might impact on human behaviour e.g. Behavioural Studies.
5. Using human tissue or fluid samples.

If the answer is **yes** to any of the above statements the following should have been considered by the researcher. Please tick as relevant:

☑ Providing participants with full details of the objectives of the research.

☑ Providing information appropriate for these whose first language is not English.

☑ Voluntary participation with informed consent.

☑ Written description of involvement.
☑ Freedom to withdraw.

☑ Keeping appropriate records.

☑ Signed acknowledgement and understanding by participants.

Based on the above information the research protocol has been:

☒ Approved by the Committee.

☐ Approved but requires minor changes (as stated below).

☐ Can be submitted after major aspects have been addressed (as stated below).

☐ Can not approved on the following grounds.

Ethics Committee Members:

Name Mr. Tom Ogilvie Graham Signature Date 7/10/16

Name Dr. Jeane Grant. Signature Date 6/10/16

Name Ahmad Majadle Signature Date 6.10.2016

Annex B: Questionnaire in Arabic language.

السيدات و السادة مرضى ضغط العين (جلوكوما) :

استكمالا لمتطلبات الحصول على درجة الماجستير في الصحة العامة من جامعة القدس.أقوم أنا الباحثة ختام الحسنات بعمل هذه الدراسة بعنوان " العوامل التي تؤثر في التزام مرضى ارتفاع ضغط العين (الجلوكوما) باستخدام العلاج بالقطرات" .

حيث أن الدراسة تهدف إلى معرفة الأسباب والمعوقات التي تؤثر على التزام المرضى الذين تم تشخيصهم بمرض الجلوكوما بالقطرات، والتي تعتبر عاملاً مساعداً في ضبط ضغط العين ، وبالتالي الحفاظ عل النظر.

الفئة المستهدفة للدراسة، هم المرضى المشخصين بمرض ارتفاع ضغط العين (جلوكوما) الذين يراجعون العيادات الخارجية في مستشفى سان جون للعيون في كل من القدس، والخليل، وعنبتا.

نسعى من خلال نتائج هذه الدراسة إلى الخروج بتوصيات تهدف إلى رفد السياسات العلاجية والإدارية في مراكز ومستشفيات العيون التي تُعنى بفحص العيون وتشخيص مرض ارتفاع ضغط العين(جلوكوما) وزيادة الالتزام بالعلاج بشكل مبكر وفعال. لذا أرجو من حضرتكم الاهتمام، وتكريس ما معدله (20) دقيقة،من أجل تعبئة هذا الاستبيان، وسيقوم الفريق المساعد بشرح وإيضاح أي استفسار يرد خلال تعبئة الاستبانه .

المعلومات التي ترد في هذا الاستبيان لن تستخدم إلا لأغراض البحث العلمي – وسيتم مراعاة السرية الكاملة ، والحرية الكاملة في المشاركة أو عدمها ، لكني أطمح لمشاركتكم ودوركم كبير في إنجاح هذه الدراسة ،ولكم جزيل الشكر.

الباحثة

ختـام الحسنات

المعلومات الديموغرافية (معلومات شخصية):

1.هل المشترك في الاستبيان بحاجة لمساعدة في قراءة الاستبيان؟

1.نعم 2.لا

2. العمر : . . . . . عاما

3 . الجنس : 1 .ذكر 2.أنثى

4.الحالة الاجتماعية : 1-أعزب /عزباء 2- متزوج/متزوجة 3 - مطلق/مطلقة 4- أرمل/أرملة

5. التحصيل العلمي :

1) أمي (لا يقرا و لا يكتب)

2) شهادة مدرسية أساسي

3) ثانوية عامة

4) دبلوم متوسط

5) بكالوريوس

6) ماجستير أو دكتوراه

6.العمل / الوظيفة 1) موظف /عامل 2)) متقاعد 3) ربة منزل

4) بلا عمل 5)غير ذلك حدد/حددي.....

7. دخل أسرتك الشهري بالشيقل :

1) ما دون 1500 شيكل 2) 1500 - 2499 شيكل 3) 2500 - 3499 شيكل

4) 3500 - 4499 شيكل 5) 4500 - 5499 شيكل 6) 5500 شيكل فأعلى

8. مكان السكن : 1) مدينة 2) قرية 3) مخيم.

9. هل يوجد للعائلة تامين صحي 1) نعم 2) لا

10.إذا كان للعائلة تامين صحي فما نوع التامين أو الجهة المؤمن لديها ؟

1) تامين حكومي 2) تامين قطاع خاص 3) تامين وكالة 4) غير ذلك.

11. هل يغطي تامين العائلة تكاليف الفحص و العلاج لمرض ارتفاع ضغط العين (جلوكوما)؟

1) بنسبة كبيرة 2) بنسبة معتدلة 3) بنسبة قليلة 4) لا يغطي الفحص والعلاج

5) لا أعلم

12.متى كان تاريخ التشخيص بضغط العين ..... بالسنوات

13.ما عدد أدوية ارتفاع ضغط العين (جلوكوما) التي تتعاطاها

1.واحد 2.اثنين 3.ثلاثة أو أكثر

14.كم عدد مرات الاستخدام اليومي لقطرات ارتفاع ضغط العين (جلوكوما) التي اوصى بها الطبيب؟

1.مرة واحدة 2.مرتين 3.ثلاث مرات أو أكثر

15.هل قمت بعمليات جراحية لها علاقة بمرض ارتفاع ضغط العين (جلوكوما) خلال الأشهر الثلاث الأخيرة ؟

1.نعم 2.لا

16.هل يوجد في العائلة أي تاريخ مرضي للإصابة بارتفاع ضغط العين (جلوكوما) ؟

1.نعم 2.لا

17.هل يوجد أمراض أخرى مثل الضغط –السكري-أمراض القلب ؟

1.نعم 2.لا

18.آخر قياسين لضغط العين : المراجعة السابقة والحالية يوم جمع المعلومات

المراجعة	تاريخ المراجعة	ضغط العين اليمنى	ضغط العين اليسرى
المراجعة السابقة			
المراجعة الحالية			

19.هل تتوفر المواصلات ووسائل النقل بين سكنك و مستشفى سان جون للعيون المقدم لخدمة الفحص و المتابعة لوضعك الصحي بخصوص مرض ارتفاع ضغط العين (جلوكوما) ؟

1.نعم 2.لا

.20

حدة البصر	قريب من النظر الطبيعي (6/6 -6/12)	نظر منخفض (يرى الضوء- 6/18)	العمى لا يرى الضوء
العين اليمنى			
العين اليسرى			

21.من قام بتحويلك إلى مستشفى سان جون للعيون؟

1.مستشفى حكومي

2.طبيب عيون من عيادته الخاصة

3..جئت وحدك/ي لعمل فحص نظر فاكتشفت بالصدفة إصابتك بمرض ارتفاع ضغط العين (جلوكوما)

هذا القسم من الاستبانه يحتوي على عدد من الأسئلة عن مرض ارتفاع ضغط العين ، وعن التجربة الشخصية مع العلاجات والقطرات وقياس المعرفة بالمرض :

الرجاء اختيار الرقم الذي يتوافق مع انسجامك ، حيث رقم 1 يمثل شدة عدم الموافقة ، 2 غير موافق،3 محايد ، 4 موافق ، 5 شدة الموافقة.

قياس المعرفة بالمرض و فوائد العلاج						
	معرفتك بالمرض وفائدة العلاج	غير موافق بشدة	غير موافق	لا اعرف	موافق	موافق بشدة
1	معرفتي الشخصية بعوامل زيادة خطر الإصابة بمرض ارتفاع ضغط العين (جلوكوما) ممتازة	1	2	3	4	5
2	معرفتي بأعراض مرض ارتفاع ضغط العين (جلوكوما) ممتازة	1	2	3	4	5
3	مرض ارتفاع ضغط العين (جلوكوما) أسبابه وراثية دائما	1	2	3	4	5
4	من الممكن أن يكون الشخص مصاباً بمرض ارتفاع ضغط العين(جلوكوما) دون ظهور أعراض عليه	1	2	3	4	5
5	الأشخاص الأكبر سنا معرضون أكثر للإصابة بمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
6	الألم هو من الأعراض الشائعة لمرض ارتفاع ضغط العين(جلوكوما)	1	2	3	4	5
7	مرض ارتفاع ضغط العين (جلوكوما) يمكن تشخيصه بالرغم من وجود ضغط طبيعي للعين	1	2	3	4	5
8	فقدان النظر نتيجة ارتفاع ضغط العين (جلوكوما) لا يمكن استرجاعه أي انه دائم	1	2	3	4	5
9	السكري من الممكن أن يسبب مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
10	إصابات العين ممكن أن تسبب مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
11	العمى ليس نتيجة محتملة لمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
12	الأسباب المؤدية إلى إصابة الشخص بمرض ارتفاع ضغط العين (جلوكوما) غير مفهومة بشكل جيد	1	2	3	4	5
13	فقدان النظر الكلي بسبب مرض ارتفاع ضغط العين (جلوكوما) يمكن منعه بالعلاجات الطبية	1	2	3	4	5
14	أعتقد أنه من الممكن بسبب مرض ارتفاع ضغط العين (جلوكوما) أن أفقد نظري خلال 10 أعوام حتى **مع استخدام العلاج بالقطرات**	1	2	3	4	5
15	قطرات العين فعالة للسيطرة الكاملة على ضغط العين لدى المرضى المصابين بمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
إدراك المريض لاحتمالية الإصابة بالمرض وشدته						
	إلى أي حد توافق على الجمل التالية	غير موافق بشدة	غير موافق	لا اعرف	موافق	موافق بشدة
16	مستوى إصابتي بمرض ارتفاع ضغط العين (جلوكوما) ليس حادا	1	2	3	4	5

17	لم افقد أي نسبة من نظري نتيجة لمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
18	ممكن أن افقد نظري نتيجة لمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
19	اعتقد انه من الممكن بسبب مرض ارتفاع ضغط العين (جلوكوما) أن افقد نظري خلال 5 أعوام **إذا لم استخدم القطرات**	1	2	3	4	5
20	إذا فقدت نفس الكمية من الرؤية على مدى السنوات الخمس المقبلة مثل السنوات الخمس الماضية بسبب مرض ارتفاع ضغط العين (جلوكوما) فإنه ليس لها أي تأثير على حياتي	1	2	3	4	5
21	اعتقد انه من الممكن بسبب مرض ارتفاع ضغط العين (جلوكوما) أن افقد نظري خلال 10 أعوام **إذا لم استخدم القطرات**	1	2	3	4	5
22	لم أتفاجأ عندما عرفت بإصابتي بمرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
23	أنا معرض للعمى أكثر من غيري في نفس المرحلة العمرية بسبب مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
24	اعتقد انه من الممكن أن أصاب بمرض أخر يسبب العمى غير مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
25	لست بحاجة إلى اخذ قطرات الضغط	1	2	3	4	5
معيقات الالتزام بالعلاج						
	أي من العوامل التالية تعيق التزامك باستخدام القطرات في العلاج	غير موافق بشدة	غير موافق	لا اعرف	موافق	موافق بشدة
26	أحيانا لا أتذكر استخدام قطرات الضغط (جلوكوما)	1	2	3	4	5
27	أحيانا أنام قبل موعد استخدام قطرات الضغط (جلوكوما)	1	2	3	4	5
28	أحيانا القطرات لا تكون معي عندما يحين وقت استخدامها	1	2	3	4	5
29	أحيانا القطرات تكون مؤلمة وغير مريحة للاستخدام	1	2	3	4	5
30	أسعار قطرات الضغط (جلوكوما) معقولة	1	2	3	4	5
31	أعاني من الأعراض الجانبية عند استخدام قطرات الضغط (جلوكوما)	1	2	3	4	5
32	أحيانا لا توجد عندي قطرات الضغط (جلوكوما)	1	2	3	4	5
33	قطراتي لا تسبب لي الألم أو الانزعاج	1	2	3	4	5
34	لدي صعوبة باستخدام قطرات العين	1	2	3	4	5
35	احتاج مساعدة لوضع القطرات في عينيي	1	2	3	4	5
36	قطراتي صعبة الاستخدام	1	2	3	4	5

37	استطيع وضع القطرة بالعين دون أية مساعدة	1	2	3	4	5
38	استخدم قطراتي كل ليلة لأنها مهمة للحفاظ على النظر و ضبط ضغط العين	1	2	3	4	5
39	هناك أشياء استطيع القيام بها للسيطرة على مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
40	هناك أشياء استطيع القيام بها لمنع تدهور وضع العين و النظر للأسوأ نتيجة مرض ارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
الالتزام بالعلاج والاعتراف بعدم الالتزام						
	أي من هذه العوامل الخاصة شجعتك على الالتزام باستخدام قطرات الضغط (العبارات من 41-42). اعتراف المريض بالتزام (العبارات من 43-44)	غير موافق بشدة	غير موافق	لا اعرف	موافق	موافق بشدة
41	استخدم منبه لإعلامي عن وقت القطرات	1	2	3	4	5
42	التجربة الناجحة لأحد أفراد العائلة أو الأصدقاء مع القطرات للسيطرة على مرض ارتفاع ضغط العين (جلوكوما) تشجعني على استخدامها	1	2	3	4	5
43	تلتزم باستخدام قطرات الضغط كل يوم	1	2	3	4	5
44	الشهر الماضي لم أنسَ أن استخدم أي من قطرات الضغط	1	2	3	4	5
العوامل المرتبطة بمزودي الخدمات الصحية						
	علاقة المريض بالطبيب المعالج إلى أي مدى توافق على هذه العبارات	غير موافق بشدة	غير موافق	لا اعرف	موافق	موافق بشدة
45	أنا اتفق تماماً مع تشخيص طبيبي لي كمريض بارتفاع ضغط العين (جلوكوما)	1	2	3	4	5
46	طبيبي لا يستمع لي	1	2	3	4	5
47	أنا سعيد بنوعية الرعاية الطبية المقدمة لي من طبيبي(يشرح لي كل ما يتعلق بمرض ارتفاع ضغط العين(جلوكوما) والعلاج وكيفية الاستخدام الصحيح للقطرات)	1	2	3	4	5

Annex C: Questionnaire in English language.

Glaucoma Treatment and Compliance Assessment Tool (GTCAT)

Demographics information:

1) Did participant need assistance reading the questionnaire? 1-Yes 2- No

2) Age: _____ years

3) Sex: 1-Male 2-Female

4) Marital Status: 1- Married 2-Single 3-Widowed 4-Divorced

5) Educational level: 1- Illiterate 2- Primary school 3-Secondary school 4- Diploma 5- PA degree 6- Master degree.

6) Job /occupation: 1- Employed /labor 2- Retired 3- House wife
4-Unemployed 5-Other specify……

7) Household Income: 1- up to 1500 NIS 2- 1500-2499 NIS 3- 2500-3499NIS
4- 3500-4499 NIS 5- 4500-5499 NIS 6- 5500 and more

8) Address \ location : 1- City 2- Rural area 3- Camp

9) Is there health insurance for the family 1- Yes 2- No

10) If yes , what is the type of the insurance: 1- Public insurance 2- Private insurance 3- UNRWA insurance 4- other ……

11) Does family insurance cover the cost of glaucoma checkup and treatments?
1-High percentage 2- Moderate percentage 3- Low percentage
4- Doesn't cover 5- I don't know

12) Date of first diagnosed: ……years (duration of the disease).

13) What is the number of eye glaucoma medication (eye drops) prescribed:

1-One 2-Two 3-Three or more

14) Frequency of using eye drops:

1-Once a day 2-Two time a day 3-Three times a day

15) Surgical Procedures related to glaucoma performed (past 3 month):

1-Yes 2-No

16) Is there past family history with glaucoma?

1-Yes 2-No

17) Do you have any systemic comorbidity such as hypertension ,diabetes, and ischemic heart disease?

1-Yes 2-No

18)

Two most recent intra-ocular pressure results	Previous visit	Current visit
Right Eye		
Left Eye		

19) Is transportation and access available between the place of residence and SJEHG which offers follow up for glaucoma patients?

1-Yes 2-No

20)

Visual acuity Category	Normal Vision (6/12-6/6)	Low Vision (LP - 6/18)	Blindness (complete lack of light perception, "NLP,"
RT eye			
LT eye			

21) Whose refer you to SJEHG ?

1-Governmental Hospital

2- Private Ophthalmic Clinic

3-You came to check your vision, and you discover that you have glaucoma (self referral).

Below are several statements. Some are about glaucoma in general, and some are about your experience with glaucoma medications. Please read each statement and circle the number that best represents your opinion.

Knowledge of patient's about glaucoma disease						
	What you know about glaucoma disease	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
1	My personal knowledge of the risk factors for glaucoma is excellent	1	2	3	4	5
2	My personal knowledge of the symptoms of glaucoma is excellent	1	2	3	4	5
3	Glaucoma is always genetic	1	2	3	4	5
4	A person can have glaucoma and not know it.	1	2	3	4	5
5	Being older increases the chances of developing glaucoma.	1	2	3	4	5
6	Eye pain is a common symptom of glaucoma.	1	2	3	4	5
7	Glaucoma can occur with normal eye pressure.	1	2	3	4	5
8	Vision lost from glaucoma is permanent.	1	2	3	4	5
9	Glaucoma can be caused by diabetes.	1	2	3	4	5
10	Glaucoma can be caused by an eye injury.	1	2	3	4	5
11	Blindness is not a possible result of glaucoma.	1	2	3	4	5
12	The reasons people get glaucoma are not well understood.	1	2	3	4	5
13	Major vision loss from glaucoma can be prevented with treatment.	1	2	3	4	5
14	I think I will go blind in 10 years if I DO use my eye drops	1	2	3	4	5
15	Eye drop medication can totally control the negative progress of my glaucoma.	1	2	3	4	5
Awareness of glaucoma patient's to the severity of their disease (glaucoma)						

	What is the level of your agreement with these sentences	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
16	The level of my eye disease is not severe.	1	2	3	4	5
17	I have lost none of my vision due to glaucoma.	1	2	3	4	5
18	All of my vision could be lost due to glaucoma	1	2	3	4	5
19	If I lost the same amount of vision over the next five years as I have over the past five, it would have no effect on my quality of life.	1	2	3	4	5
20	I think I will go blind in 5 years if I DO NOT use my eye drops.	1	2	3	4	5
21	I think I will go blind in 10 years if I DO NOT use my eye drops	1	2	3	4	5
22	I was not surprised to have gotten glaucoma.	1	2	3	4	5
23	I am more susceptible to blindness than other people my age.	1	2	3	4	5
24	I think I will develop other potentially blinding eye diseases.	1	2	3	4	5
25	I don't need to take drops.	1	2	3	4	5
Barrier to compliance with treatment						
	Which one of these barriers considered a barrier for you to compliance with topical anti-glaucoma treatment	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
26	Sometimes I forget to use my drops.	1	2	3	4	5
27	Sometimes I fall asleep before dosing time	1	2	3	4	5
28	Sometimes the drops aren't with me when it is time to take them.	1	2	3	4	5
29	Sometimes the drops are painful or uncomfortable to take.	1	2	3	4	5
30	My eye drops are reasonably priced	1	2	3	4	5
31	I suffer from side effects when using my drops.	1	2	3	4	5
32	Sometimes I am out of drops.	1	2	3	4	5
33	My eye drops cause me no pain or discomfort.	1	2	3	4	5
34	I have a great deal of difficulty putting in my	1	2	3	4	5

	eye drops.					
35	I need assistance putting drops in my eyes.	1	2	3	4	5
36	My eye drops are difficult to use.	1	2	3	4	5
37	I can place the eye drops into my eye correctly without any assistance.	1	2	3	4	5
38	I will always use my eye drops every night.	1	2	3	4	5
39	There are things I can do to control my glaucoma.	1	2	3	4	5
40	There are things I can do to prevent my glaucoma from getting worse.	1	2	3	4	5
Cause to action questions and Self reported compliance						
	What encourage you to compliance with topical anti-glaucoma treatment(statement from41-43) Self reported compliance (statement 44-45)	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
41	I use reminders to help me remember to take my eye drop medications.	1	2	3	4	5
42	A friend or family member's experience with eye drops has encouraged me to use my eye drops	1	2	3	4	5
43	Are you use your eye drops daily	1	2	3	4	5
44	Over the last month I have not missed taking my eye drops	1	2	3	4	5
Patient –physician relationship						
	Related to patient-physician relationship	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
45	I completely agree with my doctor's diagnosis of glaucoma in my eye(s).	1	2	3	4	5
46	My doctor does not listen to me.	1	2	3	4	5
47	I am happy with the care I get from my eye doctor(explain every things about the disease, it's treatments ,and the best way to use eye drops)	1	2	3	4	5

Set of Questionnaire Axis:

Knowledge: Statements1, 2, 3, 4,5, 6, 7, 8, 9, 10,11, 12

Benefits: Statements 13,14,15

Severity: Statements 16,17,18,19

Susceptibility: Statements 20,21,22,23,24,25

Barriers to compliance with treatment:26,27,28,29,30,31,32,33

Self-efficacy: Statements 34,35,36,37,38,39,40

Cues-to-action: Statements 41,42

Self-report adherence: Statement 44,45

Patient-physician relationship: Statements 45,46,47

Annex D: Cronbach's Alpha test for reliability and validity of the study tool.

Reliability :

For test the reliability of the questionnaire Chronbach Alpha calculated where it 0.733 which mean the questionnaire has a good level of reliability as in the table.

	Chronbach alpha	Number of items	Sample size
Knowledge	0.512	15	17
Awareness of glaucoma	0.936	10	17
Barriers	0.319	15	17
Cause to action	0.768	4	17
Physician relationship	0.633	3	17
Total degree	0.733	47	17

Validity:

The total degree is divided into two part more than three and less than three then use independent samples T–test if the questionnaire can discriminate between the two groups.

		Mean	St.dv	T	Df	Sig.
Total degree	Noncompliance	2.7979	.19558	-4.697	15	.000
	Compliance	3.2596	.12463			

The tool can discriminate between the noncompliance and compliance groups.

العوامل المؤثرة في التزام مرضى ضغط العين (جلوكوما) باستخدام القطرات في مستشفى سان جون للعيون (القدس والخليل وعنبتا).

اعداد الطالبة : ختام ابراهيم حسين الحسنات

اسم المشرف : د. محمد شاهين

الملخص

المقدمة : الجلوكوما هي السبب الرئيسي الثاني للعمى في العالم. أحد العوامل ذات الصلة المساهمة في هذه المشكلة هو عدم الالتزام باستخدام العلاج بالقطرات المضادة لارتفاع ضغط العين (جلوكوما). تستخدم الأدوية الخافضة لضغط العين "القطرات" بنسبة 86٪ من قبل المرضى الذين يعانون مرض الجلوكوما، ويعتبر هذا العلاج الأكثر شيوعا. على الرغم من أن التشخيص الصحيح هو جزء أساسي في علاج هذا المرض ، إلا ان العلاج المناسب له على قدم المساواة ، إن لم يكن أكبر أهمية. المرضى الذين يعانون من مرض الجلوكوما يحتاجون للعلاج مدى الحياة والمتابعة للحفاظ على النظر. نسبة الالتزام في العالم تتراوح من 5٪ لتصل الى 80٪ وبالنسبة لهذا الموضوع تتوفر معلومات محدودة في الشرق الأوسط . بينما في فلسطين لا يوجد معلومات متوفرة حول مرضى الجلوكوما بسبب عدم وجود دراسات في هذا المجال.

الهدف : الهدف من هذه الدراسة هو تقييم مستوى الالتزام والعوامل التي تؤثر على الالتزام باستخدام القطرات من قبل مرضى الجلوكوما في مستشفى سان جون للعيون في (القدس والخليل وعنبتا) .

الطريقة : المشاركين في هذه الدراسة الوصفية المقطعيه تم اختيارهم بشكل عشوائي من عيادات الجلوكوما في مستشفى سان جون للعيون في القدس والخليل وعنبتا وكان عددهن 341. وكانت الأداة الرئيسية للبحث الاستبانة (GTCAT)، حيث استخدمت لتقييم الالتزام بالعلاج باستخدام القطرات والعوامل التي تؤثر عليه من قبل مرضى الجلوكوما. وقد اعتمد الاستبيان على نموذج المعتقدات بجوانبه الستة ، فضلا عن المعلومات الأخرى ذات الصلة مثل العمر والتاريخ الطبي والجنس والدخل ومستويات التعليم ونوع التغطية التأمينية. وتشمل معظم الأسئلة ردا من 5 اجابات مقياس ليكرت (على سبيل المثال 1: لا اوافق بشده،.....5: موافق بشده).

تم تعبئة الاستبانة من خلال لقاء شخصي مع مرضى الجلوكوما من قبل اشخاص متدربين و محايدين. استخدمت الاختبارات التالية في تحليل العينة (الإحصاء الوصفي والتكرارات، اختباركاي ، اختبار ANOVA، تم تطبيق اختبار الانحدار).

النتائج : كان مستوى عدم الالتزام (71.6٪) ، عدم الالتزام لدى الذكور أكثر من الإناث (74٪) إلى (69٪) على التوالي. عدم الالتزام يزداد مع التقدم في السن حيث أن مستوى عدم الالتزام مرتفع من عمر 50 – 80 سنة .
كان أعلى مستوى من عدم الالتزام لدى مرضى الجلوكوما المطلقين (94٪). المتقاعدين والعاطلين عن العمل لديهم مستوى عالي من عدم الالتزام (81٪) و (79٪). و كان مستوى عدم الالتزام عاليا (79٪) لدى مرضى الجلوكوما الذين يتم اعتبارهم كفيفين فيما يتعلق بحدة البصر.
المستوى التعليمي ادى الى تحسين مستوى الالتزام حيث كان أعلى مستوى من عدم الالتزام لدى الأميين (76٪). المشاركين في الدراسة كان لديهم مستوى معتدل من المعرفة حول مرض الجلوكوما والتي كانت عاملا هاما مؤثرا على الالتزام بشكل إيجابي وكذلك بالنسبة للكفاءة الذاتيه للمرضى.
معيقات العلاج لها تأثير سلبي على الالتزام. العوامل الأكثر تأثيرا على درجة الالتزام كانت اولا: عدم وجود القطرات مع مرضى الجلوكوما عندما يحين الوقت لاستخدامها ، ثانيا: الآثار الجانبية عند استخدام القطرات ، ثالثا: النسيان.
وعلى الرغم من أن غالبية مرضى الجلوكوما المشاركين لديهم تأمين صحي كان لديهم مستوى عال من عدم الالتزام لأنهم لم يحصلوا على تغطية تكاليف المتابعة والعلاج من التأمين.

الكلمات المفتاحيه:
الجلوكوما، الامتثال، الالتزام، ادوية الجلوكوما (قطرات المضادة للجلوكوما)